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ABSTRACT

Noting that many communities in the United States have set the ambitious goal of enhancing school readiness, this report is intended to help communities invest wisely in school readiness initiatives. Part 1 of the report summarizes recommendations from the National Education Goals Panel (NEGP) for defining and assessing school readiness. The core conclusions are that: (1) school readiness is multifaceted; (2) family and community supports for readiness are essential to address in an assessment of readiness; and (3) school readiness is a reciprocal phenomenon. Key principles for appropriate assessment of young children are also summarized. Part 2 presents a framework for community investments based on an ecological view of child development. This framework is broader than that of the NEGP and considers factors related to the child's physical and mental health, the family context, children's experience of early childhood care and education settings, and the neighborhood context. A selective review of research is presented, emphasizing rigorously implemented experimental evaluations of intervention, longitudinal studies, and studies using multivariate analyses. Part 3 of the report delineates implications for community action and summarizes the most effective investments for school readiness, based on the review of research. Presented in tabular form, the summary identifies the level at which intervention might occur, starting at the level of the child and working outward to community-level factors and beyond. Interventions with significant impacts on school readiness are summarized, with information on interventions shown to be ineffective, as well as interventions with mixed results. Interventions that are theoretically important but without empirical evidence of their effectiveness are also summarized. The areas of intervention are: (1) child health (immunizations, nutrition, unintentional injury, lead exposure, dental health, emotional and behavioral problems); (2) family factors (economic risk, family structure, home environment); (3) early childhood care and education; (4) school transitional practices; (5) emergent literacy; (6) community/neighborhood factors; and (7) media effects. (Contains 256 references.) (KB)

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Child TRENDS

Final Report to the Knight Foundation

Background for Community-Level Work on School Readiness: A Review of Definitions, Assessments, and Investment Strategies

Part I: Defining and Assessing School Readiness—Building on the Foundation of NEGP Work

by

Martha Zaslow, Julia Calkins, and Tamara Halle

Part II: Reviewing the Literature on Contributing Factors to School Readiness

by

Tamara Halle, Jonathan Zaff, Julia Calkins, and Nancy Geyelin Margie

December 2000

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Table of Contents

Executive Summary iv

What is School Readiness? iv

How Should School Readiness Be Measured? vi

A Framework for Community Investments in School Readiness viii

Implications for Community Action xv

Introduction 1

Part I: Defining and Assessing School Readiness 3

The Controversial Goal 1 Sentence 3

Beyond the Goal 1 Sentence: Building From a Turning Point in Child Assessment 3

Component #1: Delineating Dimensions of School Readiness in Children 5

Component #2: Family and Community Supports for Children's School Readiness 10

Component #3: The Readiness of Schools 13

Principles for the Assessment of Children's School Readiness 16

NEGP's Principles for the Assessment of Young Children 16

Meisel's Review of Issues in the Assessment of School Readiness 19

Implications of Part I for Knight Foundation's Work in Communities 20

Part II: Reviewing the Literature on Contributing Factors to School Readiness 23

Introduction 23

Methodological Issues for this Review 23

Child Health 24

Health in the Early Years 24

Immunizations 25

Nutrition 26

Unintentional Injury 27

Lead Exposure 28

Dental Health 29

Child Emotional and Behavioral Problems 30

Summary 30

Family Factors 31

Family Economic Risk 31

Family Structure Risk 34

The Home Environment 39
Summary 45
Early Childhood Care and Education 45
Summary 48
School Transitional Practices 48
Summary 51
Emergent Literacy: Literacy Practices in Family and Early Childhood Care and Education Settings 52
Emergent Literacy Skills 52
Early Experiences Associated With the Presence or Lack of Emergent Literacy Skills 53
Family Interventions 54
Early Childhood Care and Education Interventions 57
Summary 58
Community/Neighborhood Factors 59
Theoretical Perspectives on Neighborhood and Community Influence 59
Community Economic Factors 60
Community Organizational Factors 64
Methodological Issues Pertaining to Community and Neighborhood Factors 66
Summary 66
Beyond the Community: Media Effects 67
Effects of Television on Children's School Readiness 68
Effects of Newer Media: Video Games and Computers 71
Interventions 71
Summary 72
Part III: Recommendations for Community Action 73
Summary Table: Review of the Research Literature and Implications for Targeted Activities to Improve School Readiness 74
References 80

Executive Summary

Many communities across the country have set for themselves the ambitious goal of enhancing school readiness. But what does school readiness mean, and how do communities know whether they have achieved it? This report is intended to help communities invest wisely in school readiness initiatives. It begins by summarizing recommendations from the National Education Goals Panel (NEGP) for defining and assessing school readiness. The report then presents a framework for community investments based on an ecological view of child development. In other words, this framework considers factors related not only to the child, but also to the child's family, early childhood care and education and neighborhood.

What is School Readiness?

The National Education Goals Panel (NEGP) was established in July 1990 and is comprised of a bipartisan group of federal and state officials who assess and report on state and national progress toward achieving the eight National Education Goals set for the nation. The first of these goals states "by the year 2000, all children in America will start school ready to learn" (NEGP, 1997a, p. 1). In addressing this first, important goal, the NEGP identified three components of school readiness: (1) readiness in the child; (2) schools' readiness for children; and (3) family and community supports and services that contribute to children's readiness.

Readiness in children. The NEGP went beyond the conventional wisdom that limited school readiness in children to "narrowly constructed, academically-driven definitions of readiness" (Kagan, Moore, & Bradekamp, 1995, p. 1). Instead, based on the research on child development and early education, the Panel argued for a broader definition that included physical, social and emotional well-being, as well as cognitive readiness. Ongoing research continues to confirm the need to think about children's readiness for school as multi-faceted (Peth-Pierce, 2000). The NEGP highlighted *five dimensions of children's school readiness* in their report, *Reconsidering Children's Early Development and Learning: Toward Common Views and Vocabulary*:

- ***Physical well-being and motor development.*** This dimension covers such things as health status, growth and disabilities. It also includes physical abilities like gross and fine motor skills, as well as conditions before, at and after birth, such as exposure to toxic substances.
- ***Social and emotional development.*** *Social development* refers to children's ability to interact socially. A positive adaptation to school requires such social skills as the ability to take turns and to cooperate. *Emotional development* includes a child's perception of him/herself, the ability to understand the emotions of other people and the ability to interpret and express one's own feelings.

- ***Approaches to learning.*** This dimension refers to the inclination to use skills, knowledge and capacities. Key components include enthusiasm, curiosity and persistence on tasks, as well as temperament and cultural patterns and values.
- ***Language development.*** This dimension includes verbal language and emerging literacy. Verbal language includes listening, speaking and vocabulary. Emerging literacy includes print awareness (e.g., assigning sounds to letter combinations), story sense (e.g., understanding that stories have a beginning, middle and end) and writing process (e.g., representing ideas through drawing, letter-like shapes or letters).
- ***Cognition and general knowledge***. This includes knowledge about properties of *particular* objects and knowledge derived from *looking across* objects, events or people for similarities, differences and associations. It also includes knowledge about societal conventions, such as the assignment of particular letters to sounds, knowledge about shapes and spatial relations and number concepts (e.g., one-to-one correspondence of numbers and objects, and the association of counting with the total number of objects).

Readiness of schools. Children's readiness is a necessary part of defining school readiness, but it is not sufficient. The NEGP urged a close examination of "the readiness and capacity of the nation's schools to receive young children" (Kagan et al., 1995, p. 41). To aid this examination of schools, the NEGP proposed ten characteristics of "ready schools"—schools that are ready to support the learning and development of young children. As stated in the Panel's 1998 report, *Ready Schools*, ***ready schools***:

- ***smooth the transition between home and school***. For example, they show sensitivity to cultural differences and have practices to reach out to parents and children as they transition into school.
- ***strive for continuity between early care and education programs and elementary schools***.
- ***help children learn and make sense of their complex and exciting world***. For example, they utilize high-quality instruction, appropriate pacing and an understanding that learning occurs in the context of relationships.
- ***are committed to the success of every child***. Schools should be aware of the needs of individual children, including the effects of poverty and race. They should also attempt to meet special needs within the regular classroom.
- ***are committed to the success of every teacher and every adult who interacts with children during the school day***. They help teachers develop their skills.
- ***introduce or expand approaches that have been shown to raise achievement***. For example, they provide appropriate interventions to children who are falling behind, encourage parent involvement and monitor different teaching approaches.
- ***are learning organizations that alter practices and programs if they do not benefit children***.

- ***serve children in communities***. They assure access to services and supports in the community.
- ***take responsibility for results***. They use assessments to help teachers and parents plan for individual students, and for purposes of accountability to the community.
- ***have strong leadership***. Leaders should have a clear agenda, the authority to make decisions, the resources to follow through on goals, visibility and accessibility.

Family and community supports for children's readiness. The NEGP identified three objectives that reflect important early supports or foundations for school readiness. As stated in the Panel's *Special Early Childhood Report (1997)*:

- All children should have access to high-quality and developmentally appropriate preschool programs that help prepare them for school.
- Every parent in the United States will be a child's first teacher and devote time each day to helping his or her preschool child learn. To this end, parents should have access to the training and support they need.
- Children should receive the nutrition, physical activity and health care they need to arrive at school with healthy minds and bodies and to maintain mental alertness. To this end, the number of low birthweight babies should be significantly reduced through enhanced prenatal care.

How Should School Readiness Be Measured?

Testing is a commonplace feature of American education. Used properly, tests and other assessment tools can help educators design and deliver the appropriate services for individual children and can facilitate community-wide or statewide tracking of children's status at kindergarten entry and later on. But tests and other assessment tools can also be misused (Shepard, Taylor, & Kagan, 1996). For example, they may result in labeling young children prematurely or inaccurately. They may also lead communities to focus just on the child's skills and overlook factors such as the readiness of schools and the availability of community supports.

Purposes of Assessment. Recognizing that tests and other assessment tools have both strengths and limitations, the NEGP identified four specific purposes for assessing the readiness of young children. As stated in the Panel's report, *Principles and Recommendations for Early Childhood Assessments* (1998), the four purposes are:

- to promote children's learning and development in order to shape instruction for individual children by identifying what they already know and what they need more help with;
- to identify children who may need health or other special services (to determine whether or not follow-up testing is needed, not for diagnosis);

- to monitor trends and evaluate programs and services in order to inform aggregate decisions; and
- to assess academic achievement to hold individual students, teachers and schools accountable for desired learning outcomes.

The Appropriate Uses and the Limitations of Assessment Tools. The Panel noted in particular that assessments should be used only for their intended purposes – i.e., tests intended for one purpose in a given situation should not be used for another purpose, and the sample used should be appropriate to the purpose of the assessment. For example, the public health department uses a different approach to track disease outbreaks than a pediatrician uses to identify illness in a child. In the same way, assessments designed to track achievement at the school district or community level need to differ from the tests used to identify learning problems in a particular child. Assessments should also be age-appropriate and linguistically appropriate, and ideally should include multiple sources of information (for example, obtaining parent and teacher informants as well as direct assessments of the child, where possible). Educators who use assessments to make decisions about individual children should also recognize that assessment results might not be reliable until children are in third grade or older.

Need for Assessments to Encompass All Five Dimensions of Readiness in Children. One of the key implications of the NEGP work is that assessments of children's school readiness should include all five dimensions of readiness in children, rather than focus only on cognitive skills. Love, Aber and Brooks-Gunn (1994, 1999) provide an extremely helpful and detailed "blueprint" for selecting measures of each of the five dimensions of children's school readiness from use in community monitoring of children's readiness.

Love and colleagues (1994, 1999) also provide detailed guidance to communities for measuring such community supports for school readiness as children's access to high quality and developmentally appropriate preschool programs. Their recommendations of specific interview items for inclusion in community surveys are based on a detailed review of measures being used in national surveys. For example, regarding early childhood care and education, they recommend items from the National Household Education Survey and the National Child Care Survey.

Need for Indicators of Schools' Readiness. While a great deal of thought has been given to appropriate measures of *children's* readiness, there is not yet consensus on measures of the readiness of *schools*. Regarding *supports for readiness*, the NEGP was able to identify a delimited set of indicators for community supports of health, parenting and early childhood care and education. But the Panel acknowledged that these are just starting points. For example, most of these indicators are only available at the national level, with *common* state indicators only available for health. Efforts are now underway to develop further state-level indicators (HHS/ASPE, 1999).

A Framework for Community Investments in School Readiness

An extensive body of research on child development helps identify the factors that influence children's readiness for school, beginning with those closest to the child and moving outward to encompass the family, early care and education and the neighborhood. This *ecological view* of child development provides a useful framework for understanding where and how communities can intervene to support and promote healthy child development in general and school readiness in particular. This approach may be especially helpful to communities as they set priorities for investments in school readiness.

There are many programs across the country that may well be effective in promoting school readiness. In this report, we limit our examples to several programs that have been rigorously evaluated or for which longitudinal data (with adequate consideration of background characteristics) are available. A table summarizing findings from the research literature and their implications for targeted activities to improve school readiness follows this executive summary; it also appears in Part III of the report.

Child Health. Children's early physical and mental health are important determinants of their later readiness for school and school success. Below we review findings on several important aspects of children's health.

- ***Health in the early years*** affects multiple dimensions of children's readiness for school. For example, low birthweight, preterm infants are especially at risk for poor health and developmental outcomes. One intervention with infants that has been effective in improving outcomes for these children is the Infant Health and Development Program (IHDP). It includes pediatric monitoring, referral and follow-ups; home visits; participation in high quality early education; and support group meetings for parents. Children participating in IHDP had gains in receptive language, cognitive development, visual-motor skills and spatial skills at 36 months (McCormick, McCarton, Tonascia, & Brooks-Gunn, 1993).
- ***Immunizations***. Immunizations protect children from communicable diseases that can cause children to miss days of school and/or result in disabilities that can potentially limit their ability to achieve in school. States, communities and private organizations across the country have experimented with a range of approaches to boost immunization rates. In general, child-specific "prompts," such as letters that contain information about individual children, combined with monetary incentives to families, appear to be helpful. A more cost-effective alternative to monetary incentives may be increased access to public health institutions (Yokley & Glenwick, 1984).
- ***Nutrition***. Poor nutrition affects children's physical and intellectual development and may therefore hinder early school success (Korenman, Miller, & Sjaastad, 1995). Programs such as the Special Supplement Nutrition Program for Women,

Infants and Children (WIC) and Food Stamps have been found to be effective in increasing the nutritional intake of children (Gordon & Nelson, 1995; Rose, Hablicht, & Devaney, 1998).

- ***Unintentional Injury***. Unintentional injuries (such as car crashes, bicycle accidents or fires) can result in long-term deficits in cognitive, behavioral and motor functioning. Parent education, accompanied by additional supports like child safety features in automobiles, is an effective way to reduce injuries (DiGuiseppi & Roberts, 2000). Community-wide or school-based education campaigns, reinforced by local legislation, may also be effective in preventing unintentional injury.

- ***Lead Exposure***. Exposure to lead can lead to serious problems, especially for young children, due to lead's interference with the development of the brain and other organ systems. Although high levels of lead exposure are now rare in the U.S., the more common chronic, low-level exposure can lead to problems such as lowered IQ, short attention span, hyperactivity, stunted growth and reading and learning disabilities. According to the Alliance to End Childhood Lead Poisoning (2000), the best way to prevent lead exposure in children is proper home maintenance (i.e., getting rid of lead-based house paint and replacing old lead water pipes) and practicing good hygiene (i.e., having children wash their hands after playing outside and before meals). Parental education in such practices and careful building maintenance may be keys to lowering lead exposure levels, especially among families living in poverty.

- ***Dental Health.*** Tooth decay, also known as dental caries, can permanently damage the functioning of teeth. In addition, a child with dental caries may not be able to eat properly, so physical growth may be diminished. Tooth loss may also occur, which could impair speech development among young children. The pain and suffering of dental caries may also result in an inability to concentrate, or increased absences from preschool (Platt & Cabezas, 2000). Children living in poverty are most at risk for dental caries (U.S. Department of Health and Human Services, 1999). Increasing access to dental care providers would likely decrease the percentage of children with dental caries. Coordinating dental health services with other social services, as well as increasing access to oral hygiene screenings and parent education in oral health practices are also thought to be "best bets."

- ***Childhood Emotional and Behavioral Problems.*** Studies suggest that children are strongly affected by their parents' mental health. For example, children whose mothers are depressed are themselves at risk of behavioral and emotional problems (Hammen et al., 1987; Radke-Yarrow et al., 1992). Addressing parents' psychological problems may have immediate benefits for children, as may interventions that jointly address parent and child problems, such as depression.

Family Factors. Research consistently shows the importance of the family environment in shaping children's early development. Family circumstances at the time of a child's birth and during the first few years of life can have long-lasting effects on children's development in general, and on children's adjustment to school in particular.

Strengthening families is another approach communities can take to enhancing children's readiness for school.

- ***Family Economic Risk***. Poverty is related to child outcomes in many ways. Poor children have worse nutrition and more physical health problems on average than children who are not poor. While there is wide variability, on average, poor children score lower on standardized test for verbal ability early in development (Brooks-Gunn, Britto, & Brady, 1999). Negative effects of poverty have also been found by age five on cognitive skills, including reading readiness, number skills, problem solving, creativity and memory (Stipek & Ryan, 1997). Poverty is also associated with an increase in emotional and behavioral problems (McLoyd, 1998).

  Government and private organizations have experimented with a broad range of approaches to lift families out of poverty or to address its negative consequences. One set of approaches seeks to raise family incomes through employment, income supplements or a combination of the two. Another set of approaches seeks to address problems associated with poverty through quality early child care, improved health care and nutrition and parenting education and family support. Some experimental interventions for low-income families (including the New Hope Project and the Minnesota Family Investment Program) have provided wage supplements or earnings disregards to increase family income and have seen some positive effects on children's cognitive and school outcomes (Huston et al., in press; Knox, Miller, and Gennetian, 2000).

- ***Family Structure***. Research suggests that children who are the result of planned pregnancies and who are raised by both biological parents in low-conflict families will have more optimal outcomes in the early years of school (Barber, Axinn, & Thornton, 1999; Moore & Manlove et al., 1997; Morrison & Coiro, 1999; Thompson et al., 1992). Children who live with only one parent may benefit from the active involvement of their other parent, as long as that contact is positive, although the research in this area is limited and mixed. Financial support from non-resident parents has been found to promote children's school success (Furstenberg, 1995; King, 1994; Knox & Bane, 1994). Since non-resident fathers' involvement tends to decrease as their children reach school age, it may be worth exploring ways to keep men involved (in terms of spending time, having a positive relationship with their children and providing financial support) at this critical point of their children's development.

  Interventions that reduce or delay childbearing among young women and men, and/or increase the spacing between children seem important as well (Bradley et al., 1987; Wood et al., 1993). One particularly promising strategy is to provide first-time teen mothers with home visits from a public health nurse who provides important information on prenatal care, child development and family planning (Olds et al., 1997). Another promising strategy is to expand outreach to men of all ages for family planning services.

- ***The Home Environment***. Several different components of the home environment can affect child outcomes. For example, the way parents and children interact, the physical environment and parents' emotional well-being have all been found to be

related to children's cognitive, social and emotional development (Caughy, 1996; Hammen et al., 1987; Radke-Yarrow et al., 1992). Results across multiple studies seem to suggest that programs that focus on parenting practices and parent-child interactions can be effective, although the particular program model and its implementation are important (Downey & Coyne, 1990; Olds et al., 1997; Patterson, 1986; Wagner & Clayton, 1999).

Early Childhood Care and Education. Quality early childhood care and education programs can enhance cognitive, emotional and social development, especially among low-income preschoolers (Kagan & Neuman, 1997). Participation in such programs can lead to immediate gains in cognitive test scores, better kindergarten achievement, lower rates of grade retention and special education placement and higher rates of high school graduation (Barnett, 1995). Several studies have demonstrated the effectiveness of quality early childhood education programs, particularly for children in poverty. These include the High/Scope Perry Preschool Project, the Carolina Abecedarian Project and the Cost, Quality and Outcomes Study. Two lessons about best practices in early childhood care and education can be derived from these studies:

- ***Quality matters***. Children benefit from environments that not only provide basic care, but that promote the development of cognitive, language, social and emotional skills, as well as health. Higher quality care settings, in addition to having better health and safety practices, are also more likely to have caregivers who offer care that is more stimulating and supportive (Vandell & Wolfe, 2000). Higher quality care involves interactions with care providers who are both more responsive and sensitive to individual children's needs, and cognitively stimulating, providing language input and guiding the child to explorations of the environment. Structural features of care that facilitate such interactions include better staff-child ratios, group size, the education and training of caregivers, as well as the compensation of caregivers.
- ***Contact between parents and the program is important.*** Parent involvement should be sought and encouraged so that parents know what their children are learning and are able to extend early education into their homes. The Head Start model emphasizes these collaborations between schools and homes, as well as with community programs and service providers to increase the likelihood that children will receive all of the services they need (Mallory & Goldsmith, 1991).

School Transitional Practices. A smooth transition into kindergarten and formal schooling can help set young children on a course for academic achievement and success. For many five-year-olds, the transition from preschool or home to kindergarten can be stressful. Children face new expectations for independence and responsibility, as well as goals that are more formal than those in preschool. They also must learn to interact with teachers in ways that involve academic progress and to negotiate more formalized routines. They often face larger class sizes as well (Rimm-Kaufman & Pianta, 1999).

Despite the fact that kindergarten entry is a critical period in children's lives, many schools do not have specific guidelines to facilitate this transition, nor is there extensive research on best practices in this area. Nevertheless, the broader literature on child development and early education does offer some general guidance for easing the transition to kindergarten:

- There should be contact between kindergartens and preschools so that kindergarten teachers can plan for individual students and so that children know what to expect during the transition (Kagan & Neuman, 1998; Smolkin, 1999).
- There should be contact between schools and homes, both before and after entry into school, so that parents can be actively involved in their children's education (Melton, Limber, & Teague, 1999; Swick et al., 1997).
- There should be connections between schools and community resources so that children can receive the services they need as soon as possible.
- Little evidence has been found to support the practice of holding children out of kindergarten for a year, and the effects can be detrimental, especially for poor and minority students (Gullo & Burton, 1992; May & Kundert, 1997).

Emergent Literacy Practices in Family and Early Childhood Care and Education Settings. Emergent literacy refers to the earliest signs of interest in and abilities related to reading and writing. Emergent literacy levels at kindergarten entry are a good predictor of reading ability throughout a child's educational career (Whitehurst et al., 1994). Given the continuity of literacy skills from early childhood through later schooling, it is clear that exposure to literacy activities and the development of emergent literacy skills are important for later school success.

Promoting children's emergent literacy skills can take place both within the family and within early childhood care and education settings. Children who live in homes where reading and writing are common and valued usually experience success with reading as they begin school (Halsall & Green, 1995). But the literacy environment and activities within a child care setting can also make important contributions to emergent literacy, especially if a young child does not come from a home that supports literacy development.

Access to books and print material is important in the home environment, as is the activity of parent-child book reading. A meta-analysis of the empirical evidence related to the amount of parent-preschooler book reading found that shared book-reading is related to language development, emergent literacy and reading achievement (Ijzendoorn & Pelligrini, 1995). However, many researchers suggest that it is not just the *amount* of parent-child reading but the *quality* of reading that is important. Parents whose children learn to read more easily do not simply read to their children but ask questions, help their children relate stories to their own lives and help them learn to predict events (Halsall & Green, 1995).

Family-based interventions have revealed promising practices, including providing free children's books to low-income families (e.g., Reach Out and Read; High et al., 2000)

and teaching parents effective interactive reading styles to use with their children (sometimes called "dialogic" reading; Whitehurst & Lonigan, 1998). Other practices that have been studied are home visitation programs (i.e., Home Instruction Program for Preschool Youngsters; HIPPY) and family literacy programs (e.g., Even Start; St. Pierre et al., 1993). The available evidence suggests that both approaches can be effective *if* adequate levels of parental access and enthusiasm are ensured.

Access to books and printed material is also important in the early childhood care and education environment (National Research Council, 1998). Preschool classrooms with play settings that contain print and where children are encouraged to interact with it are associated with better emergent literacy (Neuman & Roskos, 1993). Furthermore, the amount and quality of one-on-one or small group interactions between teachers and children is highly related to measures of language development (National Research Council, 2000).

Early childhood care and education interventions suggest that a combined approach of child-engaging book reading and phonological training is effective in improving emergent literacy skills (National Research Council, 1998; Whitehurst et al., 1994; Whitehurst & Lonigan, 1998). Teaching letter-sound knowledge has also been shown to help children learn to read (National Research Council, 1998).

Community/Neighborhood Factors. Neighborhood poverty is associated with less favorable child and youth outcomes, including school readiness and long-term academic attainment (Brooks-Gunn, Duncan, & Aber, 1997; Ensminger, Lamkin, & Jacobson, 1996; Garner & Raudenbush, 1991; Klebanov et al., 1998). For example, children in high poverty areas are at a greater risk for low birthweight, infant mortality, child abuse, behavior problems, teen pregnancy and school dropout (Gephart, 1997). In contrast, residing in a neighborhood with less than 10 percent poverty appears to predict more favorable scores on tests of cognitive abilities, above and beyond the influence of family characteristics (Brooks-Gunn, Guo, & Furstenberg, 1993). Exposure to relatively more affluent neighbors becomes increasingly important as children enter school. For example, they model important behaviors, such as regular school attendance and parental employment. Young children's behavioral and physical outcomes also appear to be influenced by the level of male unemployment in neighborhoods, above and beyond family characteristics (Chase-Lansdale et al., 1997; Coulton et al., 1995).

These findings suggest that interventions focused on aiding low-income families to relocate to more affluent neighborhoods might improve young children's chances of school success. In the Moving to Opportunity demonstration project, sponsored by the U.S. Department of Housing and Urban Development, findings from the Baltimore site indicate that families given housing vouchers restricted to low poverty areas tend to move to suburbs or low poverty urban areas and, in doing so, increase their children's educational opportunities (Ladd & Ludwig, 1997). The alternate strategy of investing in new businesses and industry in areas with high unemployment or providing job-training and/or job-placement assistance for unemployed individuals should also be evaluated for its implications for children.

Media Effects on Children. In a recent, nationally representative survey of more than 1,000 2- to 7-year-olds, researchers found that young children are exposed to some form of media for an average of 4 hours and 17 minutes per day (Roberts, Foehr, Rideout, & Brodie, 1999). Most studies of the effects of media on children have focused on the effects of television. This is due in part to the relative newness of other types of media (e.g., video games, computers, and the Internet). Overall, television studies have found that (1) content is more important than the medium itself; (2) children are active, not passive, viewers; (3) the amount of television that children watch increases rapidly over the first few years of life; and (4) individual differences in children's viewing preferences develop early and remain relatively stable over time (Huston & Wright, 1998).

Interventions related to television usage focus mainly on parent behavior. Parents and other adults can monitor the type and amount of television that young children use and, by doing so, help shape children's viewing habits and preferences (Hughes & Hasbrouck, 1996; Truglio, Murphy, Oppenheimer, Huston, & Wright, 1996). Adults can mediate the effects of television on children's prosocial, creative and aggressive behaviors by discussing and interpreting the behavior of characters on the shows children do view (Huesmann, Eron, Klein, Brice, & Fischer, 1983). However, effective parental behaviors depend on having accurate information about television programming and its effects on children. Thus, another intervention strategy includes educating parents and the general public on the effects of television programming on children's development. Research indicates that educational programs such as *Sesame Street* increase young children's letter and number knowledge, vocabulary, and positive attitudes towards school, while cartoons and adult programming do not (Huston & Wright, 1996; Rice, Huston, Truglio, & Wright, 1990; Wright & Huston, 1995). Prosocial programs such as *Mr. Rogers' Neighborhood*, when combined with related, reinforcing activities, increase preschoolers' prosocial behavior (Huston & Wright, 1998). Research also finds that watching violent programming is associated with a decrease in fantasy play among preschoolers and contributes to children's aggressiveness (Hughes & Hasbrouck, 1996; Huston-Stein, Fox, Greer, Watkins, & Whitaker, 1981; Noble, 1970). Although it is difficult to regulate the amount of violence on television, an alternative strategy would be increasing the amount of educational and prosocial television programming available for young children (Kunkel, 1998). This final intervention strategy would involve legislation on the national level, but would first require an increase in public awareness and demand for more educational and prosocial programming for children.

Research on other, newer forms of media such as video and computers is not as extensive as research on television (Wartella, O'Keefe, & Scantlin, 2000). Such research focusing on preschool age children is extremely rare at this time. One review of the literature on video games' effects on children of all ages found that video games are not directly related to psychopathology or academic performance (Emes, 1997). Computer use by children under the age of three is not recommended, based on children's developmental needs and abilities (Haugland, 2000). However, some research shows that computer programs, when combined with activities that facilitate what the programs are trying to teach, can help 3- to 4-year-olds develop a range of skills, including long-term memory, manual dexterity and verbal skills (Haugland, 1992). Currently, more information is needed about how the medium and content of newer technologies affect child

development and about how best to ensure that children benefit from these new technologies.

Implications for Community Action

As communities begin to initiate new or augment existing school readiness efforts, it is essential that decision makers, funders and other community leaders marshal the full measure of their resources. In particular, they can combine knowledge of their particular community's needs, resources and priorities with information available from research. One important resource is the conceptual work carried out by the National Education Goals Panel, building on the child development and early education research. The NEGP's work on defining the components of school readiness and the uses and misuses of readiness assessments (and more recent research building on this work) are essential background information for any local initiative. The research base also provides a structure for thinking about where to target community initiatives to strengthen children's school readiness (i.e., the child, family, school and/or neighborhood). Finally, the research provides examples of effective initiatives which helped shape positive early school outcomes, as well as promising directions for further initiatives. Building on a research base of what works, communities will be able to put their resources to use more effectively in providing ready schools and ready students.

In the table below, we summarize in very concrete terms the most effective "investments" for school readiness, based on the literature reviewed for this paper. In the left-hand column, we have noted the level at which one may want to intervene, starting at the level of the child (e.g., child health) and working outward from an ecological perspective to the community-level factors and beyond. Activities or components of interventions that the literature indicates have significant impacts on school readiness are summarized in the column labeled "What Works." The "Mixed Reviews" column contains elements that have been shown to be effective in some but not all studies, or have been found to be effective for some groups of children but not for all. Finally, the "Best Bets" column is for investments that would seem to be important from a theoretical standpoint, but currently there is no evidence of their effectiveness based on highly rigorous studies (e.g., experimental control group studies or longitudinal, multivariate studies).

Summary Table: Review of the Research Literature and Implications for Targeted Activities to Improve School Readiness

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
CHILD HEALTH				
Health in the Early Years	- At-home parenting videos for 1, 3, 5, 7, 10, & 12 months [leads to fewer severe illnesses] - Home visits, pediatric monitoring, attendance of infant in child development center, group meetings for parents (IHDP) [but different cognitive outcomes for different birth weight groups] - Prenatal care (doctor's visits, nurse home visits, proper nutrition) [guards against LBW births]			- Reduce unintended pregnancy (target female teens and males of all ages)
Immunizations	- Monetary incentives - Client-specific prompts - Increase access to public health institutions			- Create an effective immunization tracking system (IOM recommendation, 2000)
Nutrition	- Provide food vouchers (WIC, Food Stamp Program)			
Unintentional Injury	- For vehicle restraints: clinic-based parent education plus subsidies and/or positive reinforcement; Community-based, multiple pathway approach (effective for low-income families only) - For hot tap water safety: clinic-based parent education alone works - For smoke alarm ownership: clinic-based parent education alone works - For bicycle helmet use: Community-level interventions that use multiple pathways (e.g., legislation, community-wide education campaign, etc.)	- For child proofing a home: no good interventions found	- For general, unintentional injury: Community-based, multiple pathways (e.g., parent & community education, TV programs, school-based education, etc.)	
Lead Exposure	- Removing lead paint from homes			- Home maintenance

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AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
	- Replacing lead water pipes			- Parent education about good hygiene (e.g., washing hands after playing outside and before eating)
Dental Health				- Regular oral health screening - Parent education in oral health practices and proper feeding - Increase access to dental care providers - Coordinate dental health services with other services (e.g., WIC, child care, home visits, immunizations)
Child Emotional and Behavioral Problems				- "Two generation programs" - treat maternal and child depression - Alleviate family stress - Focus on the parent-child relationship
FAMILY FACTORS				
Family Economic Risk	- Job training and education for parents [improves children's cognitive outcomes] - Providing child care subsidies alone [leads to more use of formal child care arrangements]		- Raising family incomes above the poverty level [confounded with providing child care subsidies] - Job training and education for parents [mixed results for child behavioral and emotional outcomes, but impacts for cognitive outcomes]	
Family Structure	- Two involved parents, regardless of marital status [improves children's cognitive and social outcomes]		- Encouraging involvement between children and nonresident parents [need to take account of the quality of the interactions]	- Reducing unintended pregnancy

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AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
	cognitive and social outcomes] - Low conflict two-parent families [improves children's socioemotional outcomes] - Nurse Home Visitation (not paraprofessionals) beginning in pregnancy and continuing through child's second birthday [leads to wider birth spacing and fewer births over time; see additional outcomes below]		quality of the interactions]	- Reducing teen pregnancy - Financial contributions from nonresident parent [associated with children's cognitive and social outcomes]
The Home Environment	- Nurse Home Visitation: home visits by a nurse (not paraprofessional) beginning in pregnancy and continuing through child's second birthday to discuss parental health habits, parenting behaviors, and home safety [leads to reduction in child abuse, increase in child health, better academic and social outcomes for both parent and child] - Good parenting practices (e.g., sensitive response to child, non-coercive discipline) [leads to better socioemotional child outcomes]		- Other home visitation models using either professionals or paraprofessionals (Parents as Teachers; Family, Infant, Preschool Program; Healthy Families America; Home Instruction Program for Preschool Youngsters) [improved parent-child interactions, reduced maternal depression, increased child cognitive abilities, but typically small and inconsistent gains in child outcomes, or gains for only some subgroups of families]	- Focusing on the parent-child relationship
EARLY CHILDHOOD CARE AND EDUCATION	- Emphasis on multiple areas of child development (cognitive, language, social & emotional) - Stimulating environments - Quality care for children in poverty - Small student/teacher ratios - Parent involvement - Collaboration with community services - Close, caring student/teacher relationships - Stable child care arrangements	- Providing basic care in which simple routine needs are met but children aren't stimulated to learn	- Beginning care in infancy [depends on quality of the care]	

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
SCHOOL TRANSITIONAL PRACTICES	- Preschool attendance (especially for children in poverty)	- Redshirting (holding children out of kindergarten for a year)		- Contact between kindergartens and preschools - Contact between kindergartens and homes - Connections between schools and community resources - In-depth, careful screenings - Schools ready for all children
EMERGENT LITERACY				
Literacy Practices in Family Settings	- Parents reading to their children - "Dialogic" reading (making children an active part of shared book-reading by asking questions)		- Home visitation programs (i.e., HIPPY) [depends on level of involvement of parents, and intensity and quality of the program for literacy activities] - Family literacy programs (i.e., Even Start) [increases in adult GED attainment and number of books in the home, but no impacts on children's literacy; effects are dependent on intensity of program and level of participation by families]	- Providing low-income families with books (i.e., Reach Out and Read)
Literacy Practices in Early Childhood Care and Education Settings	- Teaching children the alphabet and letter-sound associations - One-on-one or small group interactions around book reading - Phonological training (i.e., separating individual sounds in words, rhyming) *combined with* "dialogic" reading (making children an active part of shared book-reading by asking questions, etc.)			
COMMUNITY/ NEIGHBORHOOD FACTORS				

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AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
Community Economic Factors	- Having affluent neighbors [predicts higher IQ]		- Not living among poor neighbors [mostly mediated by family-level factors] - Reducing concentrated poverty	- Investing in community infrastructure - Increasing jobs for men in inner-cities, municipalities, and rural areas
Community Organizational Factors			- Increasing racial diversity within neighborhoods	
MEDIA EFFECTS				
Television	- Watching educational programs such as *Sesame Street* (with or without parental supervision) increases children's vocabulary, letter and number knowledge, and positive attitudes toward school (but effects are most robust for children ages 2 to 4) - Watching prosocial television shows such as *Mr. Rogers' Neighborhood*, in combination with adult-guided, supportive activities, increases children's prosocial behavior			- Legislation to increase the amount of educational and prosocial programming for children - Educate parents on the positive and negative influences of television - Encourage adults to explain the actions and motivations of television characters to young children (this can increase children's prosocial behavior and reduce children's aggressiveness when viewing prosocial and violent shows, respectively) - Parental monitoring of children's television viewing, and adult modeling of good television viewing

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AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
				habits
Video and Computer				

Introduction

Indicators work carried out by the Knight Foundation in 26 communities makes clear that members of these communities place a high priority on supporting the development of young children. As the Knight Foundation works with communities to find ways to support children's school readiness, two bodies of knowledge can help guide its efforts:

- The work of the National Education Goals Panel Goal 1 working groups, and other researchers, educators and policymakers, in *conceptualizing school readiness*, and establishing *principles for the assessment of readiness in young children*; and
- The research on *factors in children's early years of development that contribute to positive outcomes and diminish the risk of unfavorable outcomes in the first years of elementary school.*

In this background paper, we will refer to the first body of work as focusing on *Assessing* school readiness, and the second body of work as focusing on *Investing* in school readiness. We make the assumption that as communities seek to strengthen children's school readiness, they will want guidance on these twin topics: Assessments and Investments.

In **Part I** of this background paper, we turn to the Assessment issue. We highlight key conclusions from the work of the National Education Goals Panel on school readiness and from the related research. We focus on three core conclusions of the National Education Goals Panel: (1) that school readiness is multifaceted, resting on social/emotional aspects of children's development and their health and not only their cognitive development; (2) that family and community supports for school readiness are essential to address in an assessment of readiness, along with characteristics of the individual child; and (3) finally, that school readiness is a reciprocal phenomenon, involving a process of engagement of the child and family with the school. As such, it is important to consider not only the readiness of the child but also of schools to receive and educate children and especially children with diverse backgrounds. We also summarize the key principles for appropriate assessment of young children articulated by the National Education Goals Panel working groups.

In **Part II** of this background paper, we turn to the issue of Investments: how communities can support children's school readiness. The Goal I Technical Planning Group of the National Education Goals Panel focused on three kinds of community supports: provision of services for children's health, supports for parents as children's first teachers, and access for all children to high quality and developmentally appropriate early care and education settings. This work was groundbreaking in identifying school readiness as a shared responsibility of the family and community and in articulating that *all* families and children should have access to basic supports. Some have urged that we need now to build on this pioneering work by going beyond this central set of three kinds of community supports. For example, it has been noted that diminishing violence in children's neighborhoods could also potentially contribute to children's school readiness

and indeed could be especially salient as a contributing factor in some communities (Love, Aber & Brooks-Gunn, 1994).

In Part II, we include but go beyond the three core kinds of community supports considered by the National Education Goals Panel. In particular, we adopt a broader ecological framework, considering (1) factors related to the child, specifically his/her physical and mental health; (2) factors related to the family context, (including parents' psychological well-being, parent-child relations, family structure and family socioeconomic status); (3) factors related to children's experience of early childhood care and education settings; and (4) factors related to the neighborhood context.

We present a selective review of the research in Part II, emphasizing studies that are rigorously implemented experimental evaluations of interventions, and studies that are longitudinal in design and that use multivariate analyses to account for background characteristics of families. Throughout Part II, our aim is to go beyond the broad identification of which factors appear to be linked to early school outcomes, to the identification of *specific strategies (kinds of programs and activities within these programs)* that have been attempted and evaluated, and for which there is evidence that initiating programs with these activities has the potential to contribute to improved early school outcomes.

Part I: Defining and Assessing School Readiness

The Controversial Goal 1 Sentence

A set of National Education Goals for the United States was articulated in 1990 by the Governors of all 50 states and the President. The first of these goals (Goal 1) was that "by the year 2000 all children in America will start school ready to learn" (Kagan, Moore & Bredekamp, 1995).

There has been much debate about the particular words chosen in Goal 1 (Lewit & Schuurmann Baker, 1995). For example, a position statement of the National Association for the Education of Young Children (NAEYC) focused on the appropriateness of the phrase "ready to learn," noting that "every child, except in the most severe instances of abuse, neglect, or disability, enters school ready to learn school content" (NAEYC, 1998, p. 2). NAEYC urged that, rather than readiness to *learn*, the focus be instead on circumstances that foster children's readiness for *school* or that place children *at risk for academic failure*. Love, Aber and Brooks-Gunn (1999) note a similar suggestion by the Kauffman Foundation to focus on "the importance of all children being ready to succeed in the schools they enter" (Love et al., 1999, p.1). Meisels (1999) emphasizes the contribution of the school as well as the child in proposing the following revision: "By the year 2000 all children will have an opportunity to enhance their skills, knowledge, and abilities by participating in classrooms that are sensitive to community values, recognize individual differences, reinforce and extend children's strengths, and assist them in overcoming their difficulties" (p. 63).

Beyond the Goal 1 Sentence: Building From a Turning Point in Child Assessment

While the wording of the Goal 1 sentence has been scrutinized and questioned, few question the progress that has been made through the subsequent papers produced by the National Education Goals Panel Goal 1 working groups, and in further research, in conceptualizing school readiness, and laying out principles for assessing it. The Goal 1 working groups set about their tasks at an important turning point in the research literature. As summarized by Shepard, Taylor & Kagan (1996), a 1988 survey undertaken by the National Academy of Sciences and National Association of State Boards of Education regarding testing practices for prekindergarten and kindergarten children in all 50 states led to the conclusion that "many early childhood specialists were well aware that the testing practices... did not meet professional standards for either sound measurement or educational decisions" (p. 3). The survey found IQ-like tests, with a narrow cognitive focus, being used to make grade placement and retention decisions for young children. There was a lack of evidence of reliability and validity for some of these tests. Further, the tests were being used for placement decisions despite questions about the stability of children's scores at these young ages. The survey also found inappropriate use of screening tests (specifically the use of these tests in guiding

instruction and making individual placement decisions, rather than as intended, to make a decision about the need for in-depth assessment for a possible health, emotional or learning disability).

Efforts were taken to stop such testing practices for young children in the late '80s, with joint statements by professional organizations, researchers, and practitioners against the use of testing to deny age-eligible children entry into kindergarten. A survey of states regarding their early childhood assessment policies and practices carried out in 1995-6 found progress away from the use of testing to determine kindergarten entry and retention, and a diminution in the inappropriate use of screening instruments (Shepard et al., 1996).

With these steps taken against a very narrow view of school readiness and against inappropriate assessment practices for young children, it nevertheless remained to articulate a positive conceptualization for what comprised school readiness in children, what community supports were central foundations for school readiness and how to measure these.

The Goal 1 Resource and Technical Planning Groups were asked to suggest data by which progress towards Goal 1 could be measured. Two kinds of information were recommended: first, direct indicators of the Goal, reflecting how children are doing and capturing their welfare and resiliency in the face of risk; and second, direct indicators of the objectives, reflecting the quality of services afforded young children. The working groups also subsequently extended the focus to encompass the issue of the readiness of schools for children.

Below we provide summaries of the progress made by the Goal 1 working groups toward delineating how to measure three different components of school readiness: (1) readiness in the child; (2) family and community supports and services that contribute to children's readiness; and (3) schools' readiness for children. For the first and last, the working groups identified the need for conceptual/definitional work that could lay the groundwork for the development of measures. That is, the state of research and practice did not yet permit identification of specific measures, but providing a well-articulated conceptualization would permit movement toward the selection and development of appropriate measures. Regarding family and community supports (#2), however, the working groups were able to suggest and also to provide data for specific measures.

After summarizing the progress made by the Goal 1 working groups in conceptualizing the three components of readiness, we then turn to an overview of the guidance provided by the working groups on principles of assessment in young children. In 1998 the Goal 1 Early Childhood Assessments Resource Group responded to a specific request by Congress to "create clear guidelines regarding the nature, functions and uses of early childhood assessments, including assessment formats that are appropriate for use in culturally and linguistically diverse communities, based on model elements of school readiness" (National Education Goals Panel, 1998a, p.3). This document provides specific recommendations for appropriate assessment practices and for how to guard against specific abuses that have occurred in the past. With its clear recommendations to policymakers and educators, this document, too, can provide important background for the work of the Knight Foundation in specific communities.

Component #1: Delineating Dimensions of School Readiness in Children

The Goal 1 working groups saw their task as laying out a *conceptualization* for school readiness in children that could then *guide the selection (and/or development) of specific measures* for assessment. They identified five dimensions of readiness in children's school readiness, and provided a detailed definition of each of the dimensions.

This conceptualization has, in fact, subsequently guided measures development in two major national studies: the Early Childhood Longitudinal Study-Kindergarten Cohort (a longitudinal study of a large representative sample of children who entered kindergarten in 1998, following the children's development over the early years of schooling), and the Family and Child Experiences Survey (documenting the experiences and development of children in a representative sample of Head Start Programs) (see descriptions in Forgione, 1998; and Love et al., 1999). This conceptualization has also guided efforts to measure school readiness at both the state and community level. As one example of efforts at the state level, North Carolina is working with its legislature on selecting particular items reflective of school readiness in children that map onto the five dimensions of children's readiness identified by the Goal 1 working groups (Maxwell, 2000). At the community level, Love, Aber and Brooks-Gunn (1994, 1999) provide an extremely helpful and detailed "blueprint" for selecting measures of each of the five dimensions of children's school readiness noted by the NEGP, for use in community monitoring of children's readiness.

As we have noted, a fundamental principal underlying the conceptual work in defining the dimensions of children's school readiness was the view that "narrowly constructed, academically-driven definitions of readiness—heretofore widely accepted—need to be broadened to incorporate physical, social and emotional well-being" (Kagan et al., 1995, p.1). Beyond this fundamental principle, the conceptual work was also guided by the following assumptions: (1) that assessment of young children's readiness would be intended primarily to inform public policy regarding the collective well-being of children, rather than to make decisions regarding particular programs or the educational course of particular children (see discussion below of the multiple possible purposes of assessment, and the need to match assessment tools and data collection strategies to the particular purpose). As such, it was assumed that data would be collected via a sampling of all children in a geographical unit of interest; (2) that it would be important to carry out assessments at multiple points in time (before children entered school, at the point of school entry, after a period of time in school) rather than a single time point; (3) that to capture children's school readiness it would be important to rely on multiple informants (teachers, parents, the children themselves); (4) that multiple measurement strategies should be used rather than any single measure; and (5) that it is inappropriate to develop a single "threshold" measure of readiness:

> Because individual child performance is multi-dimensional, highly variable across the dimensions, episodic, and culturally and contextually influenced, the establishment of any single "readiness" threshold is misleading and dangerous. Rather than advocating any such

> developmental threshold or a uni-dimensional approach to assessment, this effort must be understood as one that attempts to amplify the range of variables associated with early development and learning (Kagan et al., 1995, p. 6).

The multifaceted conceptualization of school readiness developed by the Goal 1 working group, and which continues to guide assessment, program and policy work, included five dimensions: (1) physical well-being and motor development; (2) social and emotional development; (3) approaches toward learning; (5) language development; and (5) cognition and general knowledge. These dimensions were viewed as interrelated rather than independent. Children's backgrounds, in terms of both culture and exposure to a range of contexts (such as early childhood care and education settings), were assumed to affect manifestations of behavior for each dimension.

Below we briefly summarize the rationale for including each dimension in the conceptualization and note the key components identified for each, drawing on the document "Reconsidering Children's Early Development and Learning: Towards Common Views and Vocabulary" (Kagan et al., 1995).

(1) Physical well-being and motor development. Children who are healthy can more readily focus on learning. Problems with health or physical development may impede the learning process by resulting in absences from school, discomfort or the need to make special accommodations. Children with significant problems with health or physical development may also face special challenges in terms of their self-perception in adapting to the school setting and in terms of developing independence within the school setting.

This dimension encompasses three components, each with subcomponents:

- I. Physical development: (A) *rate of growth* in terms of height, weight gain, and physical maturation; (B) *physical fitness* as manifested in stamina, strength, flexibility, percentage of body fat; and (C) *body physiology*, or health/ill-health of the body and organ systems in terms of diseases (e.g., asthma, ear infections) and disabilities (e.g., hearing loss, poor vision, neuro-motor disorders).
- II. Physical abilities: (A) *gross motor skills* (e.g., walking, running, jumping and climbing: movements involving the whole body); (B) *fine motor skills* (e.g., activities involving cutting, writing: movements requiring manual dexterity and precision); (C) *sensorimotor skills* (integration of sensory information with movement, requiring vision, hearing, touch and kinethesis); (D) *oral motor skills* (production of speech sounds through coordination of breathing and movements e.g., of mouth, tongue and lips); (E) *functional performance* (e.g., feeding and dressing oneself; having independent mobility and bowel and bladder control).
- III. Background and contextual conditions of development: (A) *perinatal context* (exposure to adverse conditions in utero and around the time of birth, including low birth weight, preterm birth, exposure to such substances as alcohol, tobacco and drugs); (B) *caregiving environment* (exposure to environmental factors and risks during the early years, including accident hazards, exposure to toxic substances, exposure to violence, health practices and health status of parents and

siblings, cohesion of family and social supports available to family); and (C) *health care utilization* (availability of prenatal care, and health promotion and disease prevention services, including access to and utilization of primary care services).

(2) Social and emotional development. Social and emotional development, while closely related, are distinguished from each other in that social development reflects the child's social interactions, for example with teachers and peers. By contrast, emotional development pertains to the child's "feeling states regarding the self and others" (Kagan et al., 1995, p. 18).

Learning in school occurs through interactions with teachers and peers. Positive adaptation to school requires of children such social behaviors as the ability to take turns, to work cooperatively in a group, to show empathy toward others and assertiveness (e.g., asking questions, assumption of leadership roles) without aggressiveness. Positive self-concept and the ability to interpret one's own feelings and those of others contribute to positive interactions and engagement in learning.

- Social development: The formation of positive relationships with teachers and peers in the classroom draws on children's early experiences of relationships with parents and other family members, yet is also malleable, influenced by experiences within school. Children's social competence with peers is seen as including both the ability to interact and cooperate with peers, and the ability to form and sustain relationships.

- II. Emotional development: Components of emotional development that are important to adjustment and learning in school include self concept (perceptions of the self), sense of self-efficacy, ability to comprehend others' emotions and respond appropriately to them, and ability to interpret and express one's own feelings.

(3) Approaches toward learning. A child may have skills, knowledge and abilities, but may or may not marshal these to bring them to bear on the tasks at hand. Approaches toward learning concern the inclination to use skills, knowledge and capacities. The Goal 1 working groups saw two key components to this dimension of school readiness: predisposition (less malleable: either inborn or developed very early), and learning styles (more malleable: reflecting how children address the learning process attitudinally).

- Predispositions: (A) *Gender:* gender, along with temperamental characteristics, are assumed to have both a genetic component and to reflect influences of environment and culture. There is evidence of differences in parent and teacher expectations of boys and girls. Gender may also predispose children to interest in particular subjects. (B) *Temperament:* temperamental characteristics such as shyness can influence approach to social situations in the classroom as well as "the way individuals think, perceive, understand, judge and solve problems" (Kagan et al., 1995, p. 24). (C) *Cultural patterns and values*: Cultural patterns predispose children to being familiar with, and comfortable with, certain modes of interaction in the classroom. For example, there are cultural differences in the degree to which children are expected to listen to, and receive guidance from, adults as opposed to interacting and questioning. Similarly, there are differences

in the degree to which children are comfortable with working independently and with differences in the preferred modality or approach to learning tasks (e.g., manipulating materials, visual representations, verbal discussion).

- II. Learning styles: (A) *openness to and curiosity about new tasks and challenges* (e.g., "whether children are inquisitive or accepting, exuberant or passive," p. 25); (B) *initiative, task persistence and attentiveness* (the ability to plan and undertake a task and then follow through to its completion despite interruptions or distractions); (C) *reflection and interpretation* ("the ability to draw out lessons for future use," p. 26); (D) *imagination and invention* ("the ability to form images of what is not actually present, to extend conventional thinking beyond the known and to combine previous experiences to form new ideas," p. 26); (E) *cognitive styles* (e.g., using broad vs. narrow categories of information; tendency to respond to the first reasonable solution to a problem or to evaluate alternatives; "tendency to separate details from background and to analyze information," p. 26).

(4) Language Development. Language is fundamental to the ability to communicate with teachers and peers in the school setting. It is also critical in cognitive development in providing a means of conveying concepts. "By definition, language development is the acquisition of linguistic forms and procedures and social rules and customs for acts of expression and interpretation. Such knowledge has three essential components: content (meaning), form (structure) and use (function)" (p. 29). The Goal 1 working groups distinguished between verbal language and language related to emergent literacy.

- I. Verbal language: (A) *listening* (e.g., ability to identify sounds use sounds to form words, follow directions given orally); (B) *speaking* (e.g., ability to produce range of sounds, apply grammatical rules) (C) *social uses of language* (e.g., use of social conventions within speech; use of language in a manner appropriate to context); (D) *vocabulary and meaning* (e.g., use of words used and understood); (E) *questioning*; (F) *creative uses of language* (e.g., tell a story).

- II. Emerging literacy: (A) *literature awareness* (e.g., recalling familiar stories); (B) *print awareness* (e.g., understanding that text remains same across readings, assign sounds to letter combinations); (C) *story sense* (e.g., awareness of beginning, middle, end of a story, and of the permanence of story sequence); (D) *writing process* (e.g., producing ordered scribbling).

(5) Cognition and general knowledge. This dimension comes closest to the public perception of the kinds of early learning important for schooling: mastery of such specific knowledge as names of letters and shapes. Yet this public perception also restricts cognition and general knowledge to only one of three aspects identified by Piaget: social conventional knowledge or mastery of information that rests on conventions of the particular society (e.g., consonants and vowels in the English language). Piaget also identified physical knowledge and logico-mathematical knowledge as important, and forms of knowledge that the child actively constructs through interaction with the physical world and others, and these were identified as important aspects of children's school readiness.

- I. Physical knowledge: knowledge about the properties of objects derived from observation and interaction (e.g., the way in which an object acts on an inclined plane).
- II. Logico-mathematical knowledge: knowledge related not only to physical properties of individual objects but also to similarities, differences and associations looking across objects, events or people.
- III. Social-conventional knowledge: knowledge that "reflects the agreed-upon conventions of society" (p. 37), for example, letters of a particular alphabet.

Teacher surveys as sources of confirmation for a multifaceted view of school readiness. A 1993 survey of kindergarten teachers (the Kindergarten Teacher Survey on Student Readiness), conducted by the National Center for Education Statistics, provided evidence that teachers perceive aspects of school readiness other than Cognition and General Knowledge as important (Lewit & Schuurmann Baker, 1995; Meisels, 2000; NCES, 1993). In this survey, teachers were most likely to rate as important aspects of readiness for school that children were physically healthy, rested and well nourished; able to communicate needs, wants and thoughts verbally; and that children be enthusiastic and curious in approaching new activities.

In a more recent survey of 3,600 kindergarten teachers (Frank Porter Graham Child Development Center, 1999c), substantial proportions of teachers indicated concern about the skills of children entering kindergarten. Their focus included but went beyond academic skills. For example, while 36 percent of the sampled teachers indicated that about half or more of their class entered kindergarten with problems relating to academic skills, 46 percent indicated problems with following directions, 34 percent with working independently, 30 percent with working in a group, 20 percent with immaturity and 14 percent with communicating. These concerns "map" onto the school readiness dimensions of Approaches to Learning, Social and Emotional Skills and Language Development as well as Cognition and General Knowledge.

Recent Focus on Social and Emotional Skills Needed for Early School Success. A recent set of two papers (Cavanaugh, Lippitt, & Moyo, 2000; Huffman, Mehlinger & Kerivan, 2000) and an integrative monograph based on these, commissioned by the Child Mental Health Foundations and Agencies Network (FAN), provides a strong focus on the issue of children's social and emotional development as bases for early school success. According to the monograph, "children who are socially and emotionally ready for school generally have improved school outcomes, better odds of later school and vocational success, better later social and emotional development and an easier time developing relationships with their peers" (Peth-Pierce, 2000, p. 2). At the same time, these papers indicate concern with the number of children entering school without the social and emotional skills important to positive early school outcomes.

Huffman and colleagues identify risk factors for difficulty in transitioning to kindergarten. Some of the risk factors were malleable, and evidence indicated that when changed, school outcomes for children improved (labeled "causal risk factors"). By contrast, other risk factors either were not malleable or, when changed, did not alter school outcomes. Among the seven that appeared to be causal, it is noteworthy that three pertained to the quality of early relationships (poor parenting practices, difficulties with

peer relationships, poor relationships with teachers), and a further two pertained to social and emotional issues in the child or parent (early behavior and adjustment problems, and parental psychological problems). The remaining risk factors considered causal were cognitive deficits in the child and age at school entry.

Cavanaugh and colleagues, in reviewing current federal programs that address risk factors for difficulty in the transition to school, come to the conclusion that research is not being used sufficiently to direct federal resources in early childhood policy. For example, while the research highlights difficulties in early relationships as predictive of problems in the transition to school, inadequate resources are aimed at addressing developing and maintaining early positive relationships with adults, particularly for children in families with fewer socioeoconomic resources. The authors do point out that many states are engaged in new and innovative efforts to address school readiness and that some states are moving toward integrated, comprehensive service systems for young children. While this may result in fifty different approaches, a comprehensive national strategy is still missing.

This pair of reviews calls for more research on the social and emotional skills that foster a positive transition to school, risk and protective factors for these skills, and for a greater focus on interventions and policies that can promote such skills in young children.

Component #2: Family and Community Supports for Children's School Readiness

In addition to articulating Goal 1, the National Education Goals Panel identified three "Objectives." These objectives reflect early experiences that were seen as important supports or foundations for school readiness (NEGP, 1997b, p. 1):

(1) All children will have access to high-quality and developmentally appropriate preschool programs that help prepare children for school.

(2) Every parent in the United States will be a child's first teacher and devote time each day to helping such parent's preschool child learn, and parents will have access to the training and support parents need.

(3) Children will receive the nutrition, physical activity experiences and health care needed to arrive at school with healthy minds and bodies and to maintain the mental alertness necessary to be prepared to learn, and the number of low birth weight babies will be significantly reduced through enhanced prenatal health systems.

As Kagan and colleagues (1995) point out, Goal 1 and the 3 objectives, taken together, provide a view of early experiences and school readiness as linked. They also note that providing supportive experiences for young children is a responsibility of both the family and the larger society and further clearly state that *all* children should have access to supportive early experiences.

The National Education Goals Panel acknowledged that when they undertook their work, there were as yet no direct measures of children's school readiness (although substantial progress has occurred subsequently). However, *selected indicators of the 3 objectives were already available in national datasets*. Further, uniform and comparable measures of selected *health* indicators (though not measures of parenting practices or participation in early childhood care and education) were available at the state level as well. The Goals panel reported annually on a limited set of measures for the objectives and provided more in-depth reporting in 1997 (with a further in-depth report expected in 2000).

Regarding Objective #3, the health objective, the 1997 report (NEGP, 1997b) provided data on:

- the point at which mothers first began prenatal care;
- the percentage of births above and below 5.5 pounds ("low birth weight") and 3.3 pounds ("very low birth weight");
- a Children's Health Index (percentage of U. S. births with no risk, 1 or more, 2 or more, 3 or more, with the risk items consisting of third trimester or no prenatal care, low maternal weight gain, mother smoked during pregnancy and mother drank alcohol during pregnancy); and
- the percentage of 2-year-olds with completed basic immunization series for selected diseases.

These indicators show that in 1995, 4 percent of mothers did not begin prenatal care until the third trimester or received no prenatal care at all. There were differences by race/ethnicity (the figures were 2 percent for white mothers, 7 percent for Hispanic, and 8 percent for black). The percentage of births below 5.5 pounds (the standard for low birth weight) was 7 percent, with black infants twice as likely as those from other racial/ethnic groups to be born at low birth weight (10 percent vs. 5 percent for white and Hispanic infants). In 1995, 34 percent of all infants born in the United States had one or more factors on the Children's Health Index considered to place them at risk in terms of their long-term health and educational development. There was a decrease from 1990 to 1995 (from 37 percent to 34 percent) in the percentage of infants with one or more risk factors. American Indian/Alaskan Native infants and black infants were more likely to have one or more risks than other racial/ethnic groups. Slightly more than three-quarters of all 2-year-olds had been fully immunized in 1996. At the national level, black children and low-income children were less likely to be fully immunized than others.

The availability of state-level data permit examination of the range in state statistics (NEGP, 1997b). For example, while in 1995, 81 percent of all mothers in the United States began prenatal care during the first trimester of pregnancy, this ranged across states from 60 percent to 90 percent. Across states, the percentage of infants born at low birth weight ranged from 5 percent to 13 percent. There was a substantial range across states in the percentage of children with one or more health risks, from 24 percent to 42 percent. While 88 percent of 2-year-olds were immunized in the best states, 64 percent were immunized in the worst states from the point of view of this statistic. Thus, the state level data on health indicators reveal substantial variability.

Regarding Objective #2, family-child activities supportive of school readiness, the report presented indicators of:

- The percentage of children whose parents read to them every day;
- The percentage of 3- to 5-year olds whose parents engaged in language and literacy activities with them regularly (with activities including telling the child a story 3 or more times in the previous week, and visiting a library or more times in the previous month); and
- The percentage of parents of 3- to 5-year-olds who participated in parent support activities, including attending a parenting class or any support group to help with parenting since the beginning of the school year; ever going to a family support center; or receiving more than one home visit from someone trained to talk about raising children.

National data indicate that in 1995-6, 45 percent of children between 0 and 2 were read to daily by parents or other family members, while the parallel figure is 56 percent of children between 3 and 5. These percentages varied by level of parental education, with parents who had completed high school more likely to report reading to their preschool-age children. The percentage of 3- to 5-year old children who were told stories several times a week was 55 percent, while 37 percent visited a library once or more in a month. Both types of literacy activities were reported more frequently by parents with higher levels of education. The percentage of parents of 3- to 5-year-old children reporting participation in parent support activities was relatively low, ranging from 13 percent reporting having ever gone to a family support center, to 8 percent reporting ever receiving a home visit from someone trained to talk about raising children.

Regarding Objective #1, participation in early childhood care and education experiences, the 1997 report provided indicators of:

- The percentage of children enrolled in preschool;
- Markers of child care quality for preschool centers, including percentage of teachers/caregivers with child-related training; the percentage of centers not exceeding the maximum acceptable group size for children; and the percentage of centers not exceeding the maximum acceptable child/staff ratios as recommended by the NAEYC; and
- Markers of child care quality for home-based preschool settings, including percentage of regulated family day care providers with specific forms of training and the percentage of home-based settings meeting the standard for group size for different age mixes of children.

The report notes that the proportion of young children participating in preschool settings varied with household income, from 79 percent of 3- to 5-year-olds from families with household incomes of more than $75,000, to 43 percent for children from families with incomes of $10,000 or less. The report found differences in the percentage of centers meeting group size and ratio recommendations according to child age, with more centers likely to meet the recommendations for 3- to 5-year-olds than infants and toddlers. In 1990, a smaller percentage of caregivers in home-based than in center-based settings had

child-related training and a Child Development Associate credential. Home-based settings were more likely to meet recommended group sizes when children were of similar ages than when they were of mixed ages in the care setting.

The report concludes that "current conditions for young children are far from ideal. Too many begin life with avoidable health risks. Too few are regularly engaged in supportive activities at home with their families. And far too many do not have the opportunity to participate in high quality early care and education programs in safe, caring environments that support their continued development" (NEGP, 1997b, p. 32). The report also showed differences in particular indicators by race/ethnicity, parental education, household income and across states, suggesting limitations in the extent to which the conditions supporting school readiness are available to all children.

Shepard and colleagues (1996) report findings regarding *state-level* reporting on initiatives to provide the kinds of supports noted in the three objectives and to provide measures of child and family exposure to the supports identified in the three objectives. They conclude that "although many states may have invested in early childhood programs in recent years, the majority of states do not have initiatives specifically identified with Goal 1." Their survey found fewer than 12 states with reporting mechanisms in place to report on progress towards the Goal 1 objectives. While the annual Kids Count report of the Annie E. Casey Foundation does provide state-level data on child health indicators, the survey conducted by Shephard and colleagues indicated limited awareness by state early childhood specialists that health data were linked to Goal 1 and the related objectives. In general, their paper suggests a need to expand awareness of the three objectives as linked to Goal 1. They also identify the need for work toward the development of state-level indicators of the objectives.

In recent years, the U.S. Department of Health and Human Services has provided funding and guidance to a set of states to develop state-level indicators of school readiness and of child care. There has been substantial progress in these states, particularly in developing indicators of the use and quality of early childhood care and education settings (specific indicators being developed and used by these states are presented in the summary from the project meeting in Providence, Rhode Island; HHS/ASPE Child Indicator States, 1999). There is some convergence across the states in terms of what aspects of child care participation and quality are being measured (Zaslow, 2000). For example, multiple states are working towards indicators of the proportion of eligible families receiving child care subsidies, the proportion of children eligible for early childhood intervention programs who are participating in such programs, and the proportion of child care centers and family child care homes that have accreditation.

Component #3: The Readiness of Schools

The Goal 1 working groups of the National Education Goals Panel also focused on the issue of *schools' readiness for children*:

> "The Technical Planning Group strongly believes that child outcomes should not and cannot be the sole measure of America's progress toward the first Education Goal. While specifying child outcomes is a necessary

step, it is an insufficient approach. It must be coupled with a commitment to examining social and institutional readiness to support children's early development and learning.

"To that end, the Technical Planning Group strongly urges that energy be devoted to examining the readiness and capacity of the nation's schools to receive young children." (NEGP, 1995, p. 41)

In order to address the reciprocal nature of readiness as a characteristic of both child and school, the National Education Goals Panel convened a Ready Schools Resource Group. This group used existing research and knowledge about educational practices to identify "broad strategies that school and community leaders may want to consider as they work to strengthen the transition to school and learning..." (NEGP, 1998b, p. 3). This document does not suggest specific measures for assessing the readiness of schools, but does begin to identify the characteristics of ready schools. Further work is warranted for moving from conceptualization to the identification of specific measures of schools' readiness.

The Ready Schools Resource Group identified ten characteristics of ready schools:

(1) *Ready schools smooth the transition between home and school.* For example, they show sensitivity to the cultural gap that children from low-income and minority families may face in entering school. They engage in written or personal outreach practices to help parents and children make the transition to a new school setting.

(2) *Ready schools strive for continuity between early care and education programs and elementary schools.* There may be substantial differences in level of parent involvement, organization of the classroom and teaching styles between the elementary school and children's early care and education settings. "...Contact with previous caregivers can facilitate planning for individual students, provide a sense of continuity for children and parents and allow a better alignment of philosophy, expectations and curriculum across institutions and the community" (p. 8).

(3) *Ready schools help children learn and make sense of their complex and exciting world* through a range of curriculum and instructional approaches, through high quality instruction, through appropriate pacing and content of instruction, incentives for learning, effective use of time and through understanding that learning occurs in the context of relationships.

(4) *Ready schools are committed to the success of every child* by being responsive to the needs of individual children, providing a setting that is conducive to learning and exploration, showing awareness of the impact on children of poverty and race, ensuring language minority children age-appropriate and culturally sensitive instruction and attempting to meet special needs within the regular classroom, where possible.

(5) *Ready schools are committed to the success of every teacher and every adult who interacts with children during the school day.* They are committed to giving teachers time to develop their skills and prepare for instruction.

(6) *Ready schools introduce of expand approaches that have been shown to raise achievement.* They provide prompt and supportive intervention to children who are falling behind. They encourage meaningful parent involvement. They monitor different approaches to classroom organization, staffing and grouping, and retain and expand approaches that are beneficial to children.

(7) *Ready schools are learning organizations that alter practices and programs if they do not benefit children,* for example practices concerning retention in kindergarten, redshirting, denying school entry and accelerating the academic instruction of young children.

(8) *Ready schools serve children in communities,* helping to assure access to a range of services and supports in the community.

(9) *Ready schools take responsibility for results.* They carry out assessments to help teachers and parents plan for the needs of individual students but also for purposes of accountability to the community. They share data with the appropriate individuals or groups. "Ready schools organize testing and screening strategies that are fair and valid and do not, intentionally or unintentionally, devalue cultural differences" (p. 27).

(10) *Ready schools have strong leadership.* A leader or group of leaders have a clear agenda, have authority to make decisions and resources to follow through on goals, are visible and accessible.

The national surveys noted above (the Early Childhood Longitudinal Survey-Kindergarten Cohort, and the Family and Children's Experiences Survey) each include items pertaining to the characteristics of the educational or program setting. These studies could provide important resources for moving from the conceptualization of ready schools to the identification of a core set of measures of schools' readiness that could be used in national, state and community monitoring efforts.

As we have noted, there is a great deal of activity currently going on at the state level in developing strategies for monitoring children's school readiness. Some states have chosen to make explicit the view that school readiness involves a reciprocal relationship between children and schools. North Carolina provides one example. In working toward a limited set of school readiness indicators to track over time, current plans in the state call for measures of schools' readiness as well as children's readiness (Maxwell, 2000; Meisels, 2000). Indeed, the states' plan to track school readiness is portrayed visually as a puzzle with two pieces: condition of children and condition of schools. Measures of schools' readiness being considered include kindergarten class size, percentage of kindergarten teachers with early childhood certification and percentage of elementary school principals who have completed at least one early childhood course or who have an early childhood degree.

Principles for the Assessment of Children's School Readiness

We have noted that the history of misuse of early childhood assessment was one of the motivating factors behind the work of the NEGP Goal 1 working groups. At the request of Congress, the NEGP worked to articulate a set of principles for the assessment of young children and to identify safeguards against the misuse of such assessments in the future. The set of principles articulated by the Goal 1 Early Childhood Assessments Resource Group (NEGP, 1998a) is an important resource for the efforts of Knight Foundation in working with communities on school readiness issues. A further important resource is an extremely insightful recent review of issues in the assessment of school readiness by Meisels (2000).

NEGP's Principles for the Assessment of Young Children

Fundamental to NEGP's work on this issue is the idea that there are four different purposes for the assessment of young children. The four purposes for assessing young children are: (1) assessments to support learning; (2) assessments for the identification of special needs; (3) assessments for program evaluation and monitoring trends; and (4) "high-stakes accountability" assessments, used to make decisions about individual children, teachers, classrooms or programs. The NEGP stresses the importance of using assessments for their intended purpose and suggest great care in attempting to use any one strategy of assessment for more than one purpose. Further, the purpose of assessment shapes the content of the assessment, the method of administration, the technical requirements for the assessment in terms of reliability and validity, the audience for the information from the assessment and whether or not it is appropriate to use the information from the assessment in making decisions about individual children, teachers or programs. Safeguards against misuse also differ by purpose.

For all four purposes, the distinct aspects of young children's development need to be recognized. For example, growth is more rapid in the period from birth to age eight than at other periods of development. Development may not occur at a steady pace, but rather in spurts. This may make it difficult to capture skills and abilities at any one point in time. In addition, young children learn and manifest their learning in different ways than older children. For example, they tend to learn by doing rather than just listening and may best manifest what they know in actions rather than in speech or writing. These tendencies make the needs for assessment of young children very different from those for older children or adults.

General principles identified by the NEGP are that (1) "assessments should bring about benefits for children" either individually in terms of direct services to a child or more collectively in terms of improved instruction overall; (2) "assessments should be tailored to a specific purpose, and should be reliable, valid, and fair for that purpose"; (3) "assessment policies should be designed recognizing that reliability and validity of assessments increase with children's age." Assessments for some purposes should be postponed until children are older; (4) "assessments should be age-appropriate in both content and the method of data collection"; (5) "assessments should be linguistically appropriate, recognizing that to some extent all assessments are measures of language";

and (6) "parents should be a valued source of assessment information, as well as an audience for assessment results" (p. 5).

Purpose 1: Assessments to promote children's learning and development. Assessments to shape instruction for individual children occur on an ongoing basis to identify what children know and can do, and what they should proceed to in their learning. Assessments for this purpose draw on and are embedded within the content of the curriculum. They can be collected through direct observation, collecting samples of children's work, asking children questions, and asking questions of informed adults. Assessment involves observing patterns over time. Technical requirements for this assessment purpose are the least stringent. While teachers are the primary "audience," children and parents themselves can benefit from being informed regarding this type of assessment. Also, school administrators can use the information for internal accountability (to make sure programs are succeeding and that children who need it are receiving help). The NEGP recommends that all five dimensions of children's school readiness be included in such assessments.

In terms of the need for safeguards with respect to this kind of assessment, the NEGP Goal 1 resource group notes the need to assure that the learning goals are age appropriate. They further note that teachers may need tools to assist them in observing and monitoring the progress of children. Without such tools, they may use other forms of assessment, especially screening tools, inappropriately to shape the course of instruction for individual children. Individual teachers, schools or districts may lack the resources to develop benchmarks of progress that are linked with elements of the curricula. Coordination at the state level on curricula and closely aligned assessments can be extremely helpful.

There have been some interesting recent developments, described in greater detail below, in the state-level implementation of assessments for Purpose 1. In particular, several states have chosen to implement sections of Meisel's Work Sampling System, with state-level training of teachers in completing the procedures and collection and use of the Work Sampling information for every child in kindergarten and other grades (Meisels 2000).

Purpose 2: Identifying children for health and special services. Assessment for this purpose is *a first step* in the identification of special problems (such as blindness, deafness, physical disabilities, speech and language impairment, learning disability, mental retardation) and the need for special services. Screening determines if the second step, in-depth assessment by specialists, is needed. The audiences for such assessments are parents and adults working with children. Regarding technical requirements, assessments for this purpose are brief, "fallible," cost effective and not administered by a specialist. These characteristics are tied to the fact that screening should be used to signal the need for follow-up. Serious misuse occurs when such brief screening measures are themselves used to determine the presence of problems or need for services without the appropriate follow-up. Misuse also occurs if screening measures are used for instructional decisions for children (Purpose #1).

Purpose 3: Monitoring trends and evaluating programs and services. While assessments for purposes 1 and 2 guide decisions about individual children, assessments

for purpose 3 inform aggregate decisions regarding educational and social programs. Such assessments are used to monitor trends and evaluate programs and have policymakers as their audience. According to the Goal 1 resource group, assessments with this purpose should monitor the adequacy of support services as well as child outcomes (reflecting the five dimensions of school readiness in tracking child outcomes). The consequences are for broad programs and policies, not for individual children, teachers or individual/local programs. There are high standards for technical accuracy, though the aggregate nature of the data (the fact that they are not used to inform decisions for individuals) help with the stringency of reliability and validity requirements.

A pitfall here is the use of assessments collected for the purpose of monitoring instead to inform decisions about individual children, teachers, classrooms or local programs, despite the fact that technical requirements for reliability and validity, having aimed these for aggregate level data, would not make this appropriate. A safeguard is using sampling strategies, so that data are not available for every child. Matrix sampling (sampling so that individual children receive only parts of the assessment) is a further strong safeguard against misuse of data collected for this purpose.

There are interesting recent developments with respect to assessments with purpose 3. Earlier we noted state efforts to strengthen the collection of indicators on such issues as young children's participation in early childhood care and education settings, and the quality of such care (HHS/ASPE Child Indicator States, 1999). In addition, individual states are working to select a limited number of measures of children's school readiness, to report at the aggregate level, and to track over time. For example, in North Carolina they are working to select a measure or a small set of measures for each of the five dimensions of school readiness identified by the Goal 1 working groups. As suggested in the NEGP assessment document, these data would be collected through a representative sampling of children, with matrix sampling to prevent misuse of the data for making educational decisions for individual children. The measures would rely on multiple informants, including direct assessment, maternal report and teacher ratings (Maxwell, 2000).

Love and colleagues (1994, 1999) also provide detailed guidance to communities on how to measure children's readiness and community supports for readiness. Their recommendations of specific interview items and child assessments is based on a detailed review of measures being used in national surveys, evaluations of early childhood programs, and child development research. For example, regarding the community support of children's access to high quality and developmentally appropriate preschool programs, they guide communities to use specific interview items from the National Household Education Survey, the National Child Care Survey, and the Interactional and Developmental Processes study questionnaire. For measuring children's Social and Emotional Development, Love and colleagues recommend specific scales from the Social Skills Rating System, and the Behavior Problems Index (see Love et al., 1994 for sources for each of these surveys and measures).

Purpose 4: Assessing academic achievement to hold individual students, teachers and schools accountable ("high stakes assessments"). These assessments are reported for individual students, classrooms, teachers or schools. There are serious consequences of assessments with this purpose, for example, retaining a child in a grade or awarding a

teacher merit pay. Technical standards for assessments with this purpose are stringent, as scores for individual students must have sufficient reliability and validity to provide the basis for decisions at this level. Departures from appropriate testing procedures (for example providing more time than allowed or teaching to the test) can have serious implications for the results of such assessments. Misuse here involves using assessments for purpose 4 without adequate reliability or validity to make decisions at the individual level. Given low reliability and validity for young children, the Goal 1 resource group recommends the use of assessments for purpose 4 beginning only at the end of third grade.

The Goal 1 resource group suggests great caution in using any assessment for more than one purpose. For example,

> Assessments could not at the same time be flexible and informal enough to be useful to teachers in day-to-day teaching and learning and still meet the technical requirements of reliability, standardization, comparability, validity and fairness that must be satisfied for accountability reporting. (NEGP, 1998a, p. 33)

With care that the technical requirements for each are being met and that the content is appropriate, however, the resource group noted that there could be coordination of assessments for purposes 1 and 3 (assessment to shape individual instruction, and assessment to monitor at an aggregate level).

Meisel's Review of Issues in the Assessment of School Readiness

In an extremely thoughtful review of the history of school readiness assessment, Meisels (1999) identifies four approaches to the assessment of children's readiness, each reflecting a different underlying theory. His review leads him to support the fourth, or Interactionist view of school readiness and to propose the use of assessments that reflect this view.

The first approach to school readiness, Idealist/Nativist, sees readiness as a maturational issue. In this view, readiness is not seen as something that can be accelerated in a child, but emerges according to an internal timetable. The Gesell School Readiness Test grew from this tradition (and was used extensively to make placement decisions for children, e.g., whether they were ready to begin kindergarten). The second approach, Empiricist/Environmental, by contrast, sees readiness as externally driven. Assessments in this tradition seek evidence of knowledge and skills provided by the environment. For example, they seek evidence of knowledge of such specific information as colors, shapes and one's address. In this perspective, readiness is absolute: it is either present or absent in the child. The major achievement tests grow out of this tradition. A third approach, Social Constructivist, sees mastery as a relative rather than absolute concept. Communities each provide their meaning for readiness. Children who are ready in one community may not be in another. Finally, the Interactionist view focuses jointly on the child's status and that of the educational setting. Assessments are embedded in the curriculum and are carried out over time and in the educational setting rather than removed from the everyday setting. They are used for individual instructional planning as well as evaluation. The Work Sampling System, developed by Meisels, follows this

latter approach. It relies on checklists completed by the child's teacher, portfolios of the child's work and summary reports. Teachers are trained in the observation and recording of students in actual classroom situations and are provided benchmarks to assist them in describing the children's behavior and performance.

In an important recent development, a number of states are implementing work sampling approaches (with a number specifically using Meisel's methodology), both for the purpose of shaping children's individual instruction (NEGP Purpose #1) and also to aggregate data from individual students to monitor student progress in larger geographical units (NEGP purpose #3). These states are in the early stages of training teachers, collecting and examining pilot data and implementing the procedures.

The use of Work Sampling Systems clearly addresses the recommendations of the NEGP Goal 1 resource group to strengthen assessment for purpose 1 by using resources at the state level to train teachers in observation of student skills and development, to provide tools for guiding the documentation and rating of student progress and for developing curriculum-linked benchmarks of progress that are coordinated across a state. Yet, as recommended by the NEGP resource group, the use of these assessments for multiple purposes will need to be carefully monitored. Some issues that will need to be addressed over time include (1) the use of parts of the full Work Sampling System rather than the entire system in a number of states. Reliability and validity have been assessed for the full system, leaving open the question of how well the particular segments of the system are functioning. This is particularly important given the more stringent reliability and validity requirements for assessments used for purpose 3. (2) Given that *all* children will be assessed for purpose 1 using work sampling approaches in these states, it is clearly not possible to employ the sampling strategies suggested to protect from misuse of assessments when they are used also for purpose 3. It will be important to follow implementation and assure that this approach is not being used to make placement decisions for individual children or to provide feedback, rewards, etc. to individual teachers (i.e., for high stakes assessments). (3) The NEGP working groups recommended that assessments be based on multiple informants. Work sampling approaches rely very heavily on teacher report, guided by training in the observation of students and their work. Despite the provision of training and benchmarks for describing progress in the Work Sampling System, the heavy reliance on a single observer means that it will be important to examine the possibility of any biases associated with this particular informant. Biases could potentially be exacerbated by teacher awareness that the assessments will be used for monitoring as well as for purposes of informing instruction. Other possible biases could concern ratings of minority/language minority children or children of lower socioeconomic status.

Implications of Part I for Knight Foundation's Work in Communities

There has been substantial progress over the past decade in terms of the conceptualization of school readiness and in terms of establishing positive practices for the assessment of young children. The conceptualizations of school readiness that have emerged and the

delineation of principles for assessment have implications for Knight Foundation's work within selected communities.

One of the goals of the work within communities will be to determine how each community is defining school readiness and seeking to support children's readiness. In addition to documenting the approach in each community, a further goal of this work is to determine how well community approaches map onto the definitions and approaches suggested in the research on school readiness. Our review of the "Definitions and Assessments" components of the literature in Part I of this review suggest a number of specific questions that we will want to address in carrying out site visits within communities. In particular, we will want to ask:

- Are communities thinking in terms of all three components of school readiness identified in the literature review: children's readiness, schools' readiness, and family and community supports?
- Do the Knight communities want to come up with community-specific definitions of school readiness or work toward close correspondence with definitions used at the national level?
- Focusing specifically on children's readiness, are communities defining children's readiness in term of all five dimensions delineated by the National Education Goals Panel Goal 1 working groups, or are they more narrowly focused on the cognitive aspects of readiness?
- What assessment strategies do the communities currently pursue to measure children's school readiness? Is the assessment (are the assessments) clearly organized around a particular assessment purpose (instruction, screening, progress at an aggregate level, individual accountability)? Are the strategies for collecting the data and technical requirements appropriate to the purpose? Are all five dimensions of readiness encompassed in the assessment?
- Are the communities attempting to strengthen schools' readiness for children? Which of the strategies identified by the Goal 1 working groups are they pursuing? Are there any attempts within the communities to measure schools' readiness for children? What funding streams are supporting these efforts?
- Are there community efforts to strengthen family and community supports for children's school readiness? If so, do they focus (as the three objectives articulated by the Goal 1 working groups do) on health, early childhood care and education and parenting support and practices? Do they go beyond this set to further supports? Are there any attempts to track these kinds of supports through indicators at the community level?
- Is the particular community part of any state-level efforts pertaining to children's school readiness, the readiness of schools or supports for school readiness? To what extent did the community have input into this initiative? What is the community reaction to the initiative?

- Are there special efforts within the community to support the school readiness of children from diverse backgrounds, in terms of language, race or ethnicity? What are these efforts? Are they being evaluated in any way?

Part II: Reviewing the Literature on Contributing Factors to School Readiness

Introduction

Now that we have addressed definitions of school readiness and assessments of school readiness, it is time to turn to *investments* in school readiness. What can communities do to support children's school readiness? The Goal I Technical Planning Group of the National Education Goals Panel focused on three kinds of community supports: provision of services for children's health, supports for parents as children's first teachers, and access for all children to high quality and developmentally appropriate early care and education settings. In Part II, we include but go beyond the three core kinds of community supports considered by the NEGP. In particular, we adopt a broader ecological framework, considering (1) factors related to the child, specifically his/her physical and mental health; (2) factors related to the family context, (including parents' psychological well-being, parent-child relations, family structure, and family socioeconomic status); (3) factors related to children's experience of early childhood care and education settings; and (4) factors related to the neighborhood context. These reflect "layers" of influence on children's school readiness, moving from the child, to the family, to care settings beyond the family, and to the broader social context. This *ecological view* of child development provides a useful framework for understanding where and how communities can intervene to support and promote healthy child development in general and school readiness in particular. This approach may be especially helpful to communities as they set priorities for investments in school readiness.

Methodological Issues for this Review

An extensive body of research on child development helps identify the factors that influence children's readiness for school, beginning with those closest to the child and moving outward to encompass the family, early care and education, schools and the neighborhood. In Part II of this report, we present a selective review of the research pertaining to each layer of the ecological model. We focus as much as possible on studies that use measures of children's early school progress (academic and/or behavioral adjustment in school) as outcomes. We emphasize (1) studies that are rigorously implemented experimental evaluations of interventions, in which aspects of the environment are manipulated and early school outcomes examined; and (2) studies that are longitudinal, involving the examination of aspects of the environment as predictors of early school outcomes but that use multivariate analyses taking background characteristics of the families into account. We have emphasized these types of studies for several reasons. Experimental-control group studies are better at controlling for selection bias than other designs (as long as there is not extensive attrition in the sample over time) and they also can address causal relationships more clearly than other designs. In addition, longitudinal studies that contain adequate consideration of background characteristics can address change over time and predictive validity better than cross-sectional studies. We also highlight studies that have been replicated with similar results

across different populations and geographic regions, because successfully replicated interventions appear to have a better chance of being replicated in additional locations than do studies that have been carried out in a single place, at one single point in time. For some issues, especially in the area of health, where the linkages to child school outcomes have been well established (such as child exposure to lead), we rely on studies reporting basic epidemiological/descriptive research.

Throughout Part II, our aim is to go beyond the broad identification of which factors appear to be linked to early school outcomes, to the identification of *specific strategies (kinds of programs and activities within these programs)* that have been attempted and evaluated, and/or for which there is evidence that initiating programs with these activities has the potential to contribute to improved early school outcomes. Due to the criteria we set for our selected literature review, we may not have identified *all* programs and activities across the country that may be effective in promoting school readiness.

Child Health

Over the past century, the United States has been successful in giving children a healthy start on life. This includes lower infant and child death rates and lower chronic health conditions (Brown et al., 1999). However, serious physical and mental conditions that can affect a child's ability to learn in school still persist. Antonia Novello, former Surgeon General for the United States, started the "Healthy Children Ready to Learn Initiative" with the assumption that a child is ready to learn if he or she arrives at school physically and mentally healthy (Novello, 1991). The National Education Goals Panel agreed with this initiative when it deemed physical well-being, motor development and socioemotional well-being to be important criteria for school readiness. This section will focus on the health of the child as it relates to school readiness. We will cover the topics of prenatal and infant health, appropriate immunizations, nutrition, unintentional injuries, lead exposure, dental health and child emotional and behavioral problems.

Health in the Early Years

Infant health is extremely important in regard to the cognitive and social components of school readiness, because problems at this age may lead to problems in the school years. For instance, a child's birthweight can have significant effects on his or her cognitive abilities and behavioral competence (e.g., Gross, Brooks-Gunn, Spiker, 1992; Liaw & Brooks-Gunn, 1993). The Infant Health and Development Study (IHDP) has been one major investigation studying the effects of poor infant health.

The IHDP was a three-year, multisite, randomized trial of an intervention for low birth weight, preterm infants from diverse ethnic backgrounds. The intervention included pediatric monitoring, referral, follow-ups, home visits, attendance of the infant at a child development center and support group meetings for the parents. Several reports have been written, but two are presented here for illustrative purposes. From the study data, it was found that lower child neonatal health status is a strong predictor of lower cognitive abilities tested at 12, 24 and 36 months (Liaw & Brooks-Gunn, 1993). Neonatal status remained a strong predictor even after the effects of maternal environment and the

treatment were taken into account. It was found, though, that the intervention was effective at 36 months in regard to gains in receptive language and visual-motor and spatial skills (Brooks-Gunn, Liaw, & Klebanov, 1992). In fact, cognitive development scores were 7.2 points higher for the intervention group as compared to the control (McCormick, McCarton, Tonascia, & Brooks-Gunn, 1993). Moreover, the effects were most positive for the most at-risk families (i.e., children whose parents had a high school education or less and who were of ethnic minority status; Brooks-Gunn, Gross, Kraemer, Spiker, & Shapiro, 1992). A later study, examining the same sample of children at eight years of age, supported the earlier findings by showing that a subsample that was heavier at birth (though still low birthweight) had higher scores on several cognitive tests (i.e., reading, math, overall IQ) than a lower, low birthweight cohort (McCarton et al., 1997). However, it should be noted that the cognitive test scores of the low birthweight cohort were still within a normal range, based on a nationally representative sample. Other studies have found similar results (e.g., Holmes, Reigh, & Rieff, 1988). A reanalysis of IHDP was conducted by investigators independent from the IHDP research consortium (Baumeister & Bacharach, 1996). The researchers found that birthweight, either directly or interacting with the intervention, was a significant predictor of cognitive outcomes. However, only seven percent of the variance of cognitive outcomes was accounted for by the intervention model. Other factors such as maternal intelligence and the home environment were considered to be important mediating factors for the entire sample. The results from the reanalysis also suggest that cognitive deficits in early childhood (i.e., at three years of age) may regress toward the mean as the child ages, even within two years of the program's completion (i.e., when the child is five years old). This finding suggests that cognitive deficits may disappear without the need for an intervention.

The impact of parenting skills on infant health was supported by an evaluation of an at-home video course for parents of preterm infants (Brown, Yando, & Maxwell, 2000). The video course, produced by *My Baby U* consists of a set of videos and short books that teach mothers about an infant's state of awareness, individual temperament and cognitive, motor, perceptual and emotional capabilities and needs. Each video in the set is for a different age (i.e., one-month-old, three-months-old, five-months-old, seven-months-old, ten-months-old, and one year old) and is sent to the parent when the child reaches the age in the specific video. Two hundred fifty-one expectant mothers were randomly assigned to the video intervention (n=116) or a non-intervention control group (n=135). Mothers in the intervention group had children that had fewer severe illnesses over the course of the first year as compared to a non-intervention control group.

IMMUNIZATIONS

There is general consensus that immunizing children is beneficial. Fewer severe diseases result, which enables children to attend school in a healthy state on a regular basis and results in fewer financial and psychological burdens on families. According to the National Immunization Survey (NIS), initiated by the Centers for Disease Control and Prevention, vaccination rates for the recommended round of immunizations for children age 19 to 35 months is the highest ever recorded (Centers for Disease Control and

Prevention, 1998).[1] This finding, based on 1997 data, showed a national immunization level of 83.3 percent, ranging across states from 69 to 91 percent. This rate, based on surveys of 32,652 household representing 33,064 children, is an increase of 1.5 percent over the 1996 level. It should be noted that immunization levels for Hepatitis B and Pertussis have not reached the same high rates for vaccination as for other diseases (Teitelbaum & Edmunds, 1999).

Unfortunately, certain populations have not had as much success with increasing immunization rates. For instance, in a study conducted in low-income areas of Los Angeles, only 53 percent and 70 percent of African American and Latino children, respectively, were up-to-date on their immunizations at 3 months of age (Wood et al., 1995). The rate decreased to 42 percent for Latino children and 26 percent for African American children at 24 months. Though the reasons for the lower rates were not conclusive, there are obviously barriers that must be overcome. For instance, there may be an unintentional bias to detect low rates, and subsequently try to increase those rates, in Caucasian American and higher income neighborhoods. A recent report by the Institute of Medicine (IOM) Committee on Immunization Finance Policies and Practice (Institute of Medicine, 2000) states that the current methods for tracking immunization rates through private insurers and providers excludes certain high-risk populations, such as children on Medicaid. The report concludes that non-detection of low vaccination coverage in distinct pockets may provide a "reservoir" for disease outbreaks. Therefore, the IOM committee recommends an increase in public and private spending of $1.5 billion over the next five years to fund an effective immunization tracking system.

One study attempted to overcome low rates of immunization in a medium-sized Midwestern city (Yokley & Glenwick, 1984). Families of 1,133 immunization-deficient children were randomly assigned to six groups: group 1 received a general letter that indicated the types and timing of childhood immunizations; group 2 received a client-specific letter that contained immunization information about the particular child; group 3 received a specific letter and increased public health access; group 4 received a specific letter and a monetary incentive; group 5 received a control letter; and group 6 received no letter. A monetary incentive had the largest effect on increasing immunization rates, followed by the increased access group and the specific letter group. The researchers concluded that although monetary incentives were the most effective, using client-specific prompts, such as letters, might be the most cost-effective.

NUTRITION

The Committee on Nutrition of the American Association of Pediatrics has developed a series of recommendations for infant feeding during the first six months of life (Committee on Nutrition, 1998). These suggestions include breastfeeding, using infant formula if not breastfeeding, not using cow's milk and not giving solid foods in the first four months. For the fifth and sixth months, solid foods can be introduced if the infant is able to support himself or herself in a seated position.

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[1] Recommended vaccinations include immunizations for Measles, Mumps, Rubella, Polio, and Haemophilus Influenzae Type B.

The effects of proper nutrition can be seen in Korenman, Miller and Sjaastad's (1995) study using data from the National Longitudinal Survey of Youth. They found that nutritional deficits contributed unique and significant variance to lower cognitive test scores when the home environment and maternal characteristics were taken into account.

Grantham-McGregor (1995) conducted an in-depth review of the literature on cognitive and behavioral deficits of nutritionally deprived children. From case controlled studies, it was concluded that, using epidemiological principles, there is a causal link between nutrition and cognitive and behavioral outcomes. However, there is still a question about whether acute episodes are more or less detrimental than smaller but persistent nutritional deficits.

The Special Supplement Nutrition Program for Women, Infants, and Children (WIC) and the Food Stamp program are both designed to help parents provide proper nutrition for their children. Several studies have been designed to examine the effects of these two programs. Compared to giving only additional income to families, both WIC and Food Stamps have been found to increase the nutritional intake of children; WIC was found to increase the intake of 10 nutrients while Food Stamps increased the intake of five nutrients (Rose, Habicht, & Devaney, 1998). Gordon and Nelson (1995) performed a separate evaluation of WIC, comparing participants to income-eligible non-participants. Using data from the 1988 National Maternal Health Survey, the investigators found that WIC participants were more likely to use infant formula over breastfeeding than income-eligible non-participants, thus going against the recommendations of the Committee on Nutrition (1993). WIC participants were also more likely to use infant formula over cow's milk at five and six months. Although WIC and Food Stamps are not completely effective in changing feeding behaviors, it appears that they are effective programs for improving the nutritional intake of children.

Unintentional Injury

There were over 13,000 child deaths from unintentional injury in 1996; over six times that number of children had non-fatal injuries (CDC, 1999). The injuries can result from a plethora of causes, such as bicycle accidents, car crashes, drowning or being caught in a fire. Aside from pain, suffering and the emotional and economic cost to the family of an injured child, long-term deficits of cognitive, behavioral, and motor functioning of the child may occur. This could lead to a reduction in the quality of life of the child (Deal, Gomby, Zippiroli, & Behrman, 2000).

Two types of strategies have been implemented for preventing unintentional injuries: interventions that target the individual, and those that target the community. These strategies have been reviewed in the most recent edition of *Future of Children* (DiGuiseppi & Roberts, 2000; Klassen, MacKay, Moher, Walker, & Jones, 2000). DiGuiseppi and Roberts (2000) reviewed randomized controlled studies of individual-level programs. The studies were restricted to those examining children under 20 years of age, having interventions delivered in a clinical setting and having randomly assigned experimental and control groups. Interventions for motor vehicle restraint use that only included educating the parents did not produce a significant decrease in injuries compared to the control groups. However, when education was paired with subsidized devices (i.e., lending car seats) or when education was paired with positively reinforcing

the safety behavior, there was a strong effect of the education on improved safe behavior and decreased injury.

Parent education on its own appeared to be significantly effective for using safe hot tap water temperatures in order to prevent hot water scald burns. Similar effects were found for smoke alarm ownership.

However, interventions for childproofing homes were not as successful, with little effect shown for even intensive education-based interventions. Reasons for this include the interventions possibly needing to be *more* intense, the families being confused by the vast number of safety practices or the inability to acquire the various safety devices. Overall, interventions seem to be effective for vehicle safety and using safe hot tap water if they are implemented in a straight-forward manner and the instructions for the safety procedures are easy for the families to follow.

Community-level interventions generally focus on changing safety behaviors by altering social norms, either through legislation or community change. Interventions were reviewed if they included a control group, had a target population between 0 and 19 years of age and the study reported changes in injury rates or injury reducing behavior. For bicycle helmet use, Klassen and colleagues (2000) concluded that the most effective strategies were those that used multiple pathways, such as passing legislation requiring helmet use paired with an educational campaign. This strategy proved to be effective in a Mid-Atlantic state, with 47 percent of the legislation-plus-education group using helmets compared with 19 percent of the education-only group and 4 percent of a control.[2]

Similar multiple strategies were again effective for increasing use of motor vehicle restraints. However, there was an interaction between the intervention strategies and income level, with the interventions having a stronger effect on low-income as opposed to high-income families.

Pedestrian and general injury prevention programs that use parent and community education, television programs, school-based education and/or various community programs have not had very robust effects. A possible problem with these findings is that the evaluations compared samples that were too close in proximity and therefore the control groups may have been affected by the programs. Overall, there is support for using some types of community-based strategies for preventing unintentional injuries. Using multiple community-wide methods, such as legislation combined with an educational campaign, appears to be most effective.

Lead Exposure

The percentage of children with elevated levels of lead in their blood has declined sharply since the 1980s. Between 1991 and 1994, 4.4 percent of children ages one to five had elevated blood lead levels, compared to 88.2 percent between 1976 and 1980. However, 8 percent of poor and minority children have elevated levels of lead in their blood (U.S. Department of Health and Human Services, 1999). Exposure to lead can lead to serious problems, especially for young children, as it can interfere with the development of the

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[2] Only 4 percent of the legislation-plus-education group used helmets at pre-test.

brain and other organ systems. Although high levels of lead exposure are now rare in the U.S., the more common chronic, low-level exposure can lead to problems such as lowered IQ, short attention span, hyperactivity, stunted growth and reading and learning disabilities. There is no medical treatment for lead poisoning, and the only way to prevent it is by removing the source of exposure (Alliance to End Childhood Lead Poisoning, 2000).

The most common way to be exposed to lead is from lead-based paint. Even though lead in paint was banned through federal regulations in 1978, two-thirds of all housing contains some leaded paint. This only becomes dangerous when lead dust is created by deteriorating paint (a problem in poorly-maintained housing) or when repainting and remodeling is done without proper safeguards. Two other possible points of childhood exposure to lead are soil (contaminated by flaking exterior paint) and water (contaminated by lead from old pipes). The best way to prevent lead exposure in children is good home maintenance, keeping indoor areas where children play dust-free and clean and having children wash their hands after playing outside and before meals (Alliance to End Childhood Lead Poisoning, 2000). Parental education in such practices and careful building maintenance may be the keys to seeing the levels of lead exposure continue to decline, especially among families living in poverty.

Dental Health

Tooth decay, also called dental caries, can be a source of pain and suffering for children and can permanently damage the functioning of their teeth. Oral health is important to child development. At the most fundamental level, a child with dental caries may not be able to eat properly, so physical growth may be diminished. Tooth loss can also impair speech development among young children and, later, can result in an inability to concentrate or increased absences from preschool (Platt & Cabezas, 2000).

Dental caries can be caused by a lack of access to preventive care, a lack of information about proper dental hygiene, poor feeding habits or poor nutrition. The prevalence of dental caries is highest among children living in poverty—the rate is 29.7 percent for poor children between the ages of two and five, compared to 8.6 percent of non-poor children (U.S. Department of Health and Human Services, 1999).

Even though dental disease is the most common disease among children, dental services are usually not coordinated with other health and social welfare services in communities. An exception to this is Head Start, which has a federally mandated dental component that includes screening, preventive services and education of parents. Platt and Cabezas (2000) suggest that oral health screenings and parent education in oral health practices should be a part of other health screenings. Alternately, referrals for dental health services and parental training in proper feeding and dental hygiene (which is especially important as children's permanent teeth begin growing in) should occur at points of entry into other services such as WIC, child care, home visits and during immunizations. Finally, increasing access to dental care providers would be a necessary step in decreasing the percentage of children with dental caries.

Child Emotional and Behavioral Problems

In comparison with non-depressed children, depressed children, which comprise between seven to 14 percent of the child population, have been found to have more maladaptive social behaviors, such as poorer problem-solving and conflict-negotiation skills and affect-regulation deficits (Rudolph, Hammen, & Burge, 1994).

Children of depressed mothers are at an increased risk of developing depression (Hammen, Adrian, Gordon, Burge, & Jaenicke, 1987; Radke-Yarrow, Nottelmann, Martinez, Fox, & Belmont, 1992). However, other factors such as family stress, should be considered as well. Radke-Yarrow and colleagues (1992) observed children (ages 1.5-3.5) of depressed (i.e., unipolar), manic-depressive (i.e., bipolar), and non-depressed mothers, along with their older siblings (ages 5 to 8), at baseline and at a three year follow-up to determine how maternal depression affects children. Findings supported their hypothesis that children of unipolar depressed mothers would exhibit some form of psychopathology (i.e., either depression, anxiety, or both). The question of whether long-term maternal depression or present maternal emotional state are more predictive of child depression was examined in a small study of 8- to 16-year-old predominantly Caucasian American children and their mothers. The investigators found that the current emotional state of the mother was most predictive of child behavioral problems, including child depression. Maternal depression, however, is possibly part of an additive model in which parenting behaviors are included (Burge & Hammen, 1991). However, a more recent review of the depression literature has conflicting findings, concluding that chronic depression has the most negative impact on children's mental health (Beardsley, Versage, & Wright, 1997). Although more research is needed before a definitive answer can be given about the chronicity of maternal depression, the research is rather definitive that maternal depression, regardless of length of illness, predicts child depression. Intervening with the mother, therefore, could be one avenue for preventing emotional and behavioral problems in children.

Summary

Based on the current state of the evidence, which varies in its completeness and quality, a number of implications can be suggested for communities seeking to improve child health. For child emotional well-being, studies have found that maternal depression is predictive of child depression, although the effect of the length of maternal depression on children has not been definitively concluded. This finding implies that addressing current parental psychological problems may have immediate benefits for children (or, two-generation interventions, where both parent and child depression are simultaneously addressed may work well, too). Again, parent-child interactions and parenting strategies may be the link between maternal and child depression.

To boost immunization rates, it appears that client-specific prompts accompanied by monetary incentives work best, although a more cost-effective option is client-specific (i.e., personalized) prompts accompanied by increased access to public health institutions.

In contrast, giving money to parents does not necessarily increase the likelihood of them buying nutritious food for their children and properly feeding infants (e.g., giving the infant breast milk or formula instead of cow's milk). However, government programs

such as WIC and Food Stamps, which provide vouchers for food, do increase the nutritional intake of children. Increasing the availability and use of these programs to income-eligible families seems to be a somewhat effective strategy for insuring a good diet for infants and young children.

Parent education on the harmful effects of lead exposure and improper dental care may encourage better hygiene practices in the family. Increasing access to dental care providers and coordinating their services with other social services has also been suggested as a strategy to improve children's dental health.

Finally, in terms of avoiding unintentional injuries, it appears that parent education is most effective when accompanied by subsidized equipment, such as vehicle safety, or by positive reinforcement of the safety behavior. However, community-wide efforts accompanied by local legislation may be another strategy for effectively preventing childhood injuries.

Various domains of child mental and physical health have been described. From this review, one can see that there are enough data on the predictors of infant health and child mental health with which to implement programs. Focusing on the education and parenting quality of the guardian appears to be an important part of any program, such as treating maternal depression or teaching the parent how to care for the physical and mental well-being of his or her child. Supplying the family with basic resources such as proper food and medical care also appears to be essential. These recommendations hold true for nutrition, immunizations, lead exposure, dental health and unintentional injury, although the findings are less conclusive.

Family Factors

Family Economic Risk

Currently nearly one in five children in the United States live at or below the poverty level. The rate increased from 17 percent in 1975 to 22 percent in 1993, and then lessened to 19 percent in 1997 (U.S. Department of Health and Human Services, 1999). However, the rate for children under age five is even higher, at 23 percent (Annie E. Casey Foundation, 2000). The large number of young children in poverty is cause for concern because it has been found that poverty during the first five years of life is more detrimental than poverty experienced at any other point during childhood or adolescence. In particular, poverty before age five is associated with fewer total years of schooling, so it would appear that such children are set on a trajectory for school failure and dropout (McLoyd, 1998).

The effects of poverty on childhood development are numerous. Poor children have worse nutrition than nonpoor children, and more physical health problems such as low birthweight, growth stunting, and more hospitalizations. Lower scores on standardized tests for verbal ability have been found as early as age two (Brooks-Gunn, Britto, & Brady, 1999). Negative effects of poverty have also been found by age five on cognitive skills, including reading readiness, number skills, problem solving, creativity and memory (Stipek & Ryan, 1997). Furthermore, poverty is associated with an increase in emotional and behavioral problems (McLoyd, 1998).

It is clear that poverty has a strong association with children's school readiness, and there are many possible pathways through which it can influence developmental outcomes. As proposed by Brooks-Gunn, Britto, and Brady (1999), one pathway is nutrition and health, often beginning with mothers' lack of prenatal care. Another is a home environment unsuitable for early learning and development, and even presenting physical dangers for children. Parental mental health and parent-child interactions are other factors to consider (see later section on the home environment). The stress associated with poverty or the loss of a job can lead to problems in maternal mental health which, in turn, can lead to poor parenting. Parents in poverty are more often punitive and coercive, and often deal with their children in a way that lacks support, involvement and consistency. Another possible pathway is through community effects as poor families often have no choice but to live in undesirable neighborhoods (see later section on neighborhoods). Furthermore, low-quality child care can have detrimental effects on child development (Peisner-Feinberg & Burchinal, 1997). Here we discuss several experimental studies that highlight some of these pathways.

Many approaches have been employed to address the problem of poverty and school readiness. Trying to teach parents work skills and raise families' incomes above the poverty level is one option. Another is to address the problems that are associated with child poverty by doing such things as providing quality early child care, improving nutrition and health care, teaching parents effective parenting skills and educational activities to carry out with their children, or improving the social network and support for stressed poor mothers. The main focus of the three studies that will be summarized here was the alleviation of poverty itself.

The aim of the New Hope Project was to raise poor families' incomes above the poverty level and observe the effects on children (Huston et al., in press). Participating parents were older than 18, had one or more child between ages one and ten, had incomes at or below 150 percent of the poverty level and were willing to work 30 or more hours per week (those in the experimental group without jobs were given a community service job that paid minimum wage). Families were randomly assigned to the experimental group (366 families) or the control group (379 families). In addition to help finding jobs, experimental group families were given wage supplements, subsidies for childcare, and health insurance. Child outcomes including school performance and motivation, social behavior, and psychological well-being were investigated. Data were collected two years after the initiation of the project.

Overall, the impacts were greater for boys than they were for girls. The authors posit that the differences between boys and girls were due to the fact that girls were already at higher levels than boys on the measures they used. Nevertheless, the effects for boys were significant and noteworthy. New Hope boys scored higher than control group boys on measures of educational progress and motivation. They also received better teacher ratings of classroom behavior as they were seen as less disruptive, aggressive and hyperactive. It was also found that parents expressed feeling less stress, more social support and greater goal-expectations for themselves. One aspect of the research that needs careful consideration is the fact that New Hope children spent more time than control group children in preschool programs and after school child care. Since the researchers did not separate out the effects of each component of the intervention, this

raises the possibility that increasing families' incomes above the poverty level might not be necessary, but that child care subsidies alone might be enough to improve developmental and school outcomes.

A similar program with similar results was the Minnesota Family Investment Program (MFIP; Knox, Miller, & Gennetian, 2000). A large pilot study of MFIP as a replacement program for the traditional Aid to Families with Dependent Children (AFDC) was begun in 1994. MFIP is a program of financial rewards for work and mandatory participation by those who have been receiving long-term welfare in employment-focused services. Thus, families' welfare receipt does not decline and their incomes are raised above the poverty level. Fourteen thousand families were randomly assigned to either MFIP or AFDC. Researchers found that participation in MFIP led to large increases in employment and earnings, a decline in domestic abuse and a small increase in the marriage rate. Perhaps most importantly as far as school readiness is concerned, children in MFIP exhibited fewer behavior problems, performed better in school, and were more engaged in school. It is noteworthy that the program included no sort of education for parents in parenting skills, so it would appear that raising their incomes was enough to produce positive results for children and families. However, as with the New Hope Project, it must be taken into account that participating children took part in more stable child care. Because of participation in child care, even though it seems that raising families' incomes above the poverty level has many positive effects, the findings cannot be attributed to increased income alone.

A third program related to poverty, and to the alleviation of welfare receipt in particular, is the Job Opportunities and Basic Skills Training Program (JOBS). As part of the Family Support Act of 1988, JOBS was designed to provide either job training and education or the quick acquisition of a job for those receiving welfare. JOBS was replaced by the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) in 1996, shifting the emphasis from job training to job placement (Brooks-Gunn, Britto, & Brady, 1999). However, an evaluation of JOBS provides valuable lessons on the efficacy of parental education and job training in alleviating poverty and altering child development.

The Child Outcomes Study involved over 3,000 families in three cities (Atlanta, GA, Grand Rapids, MI, and Riverside, CA). Mothers of preschool-age children were randomly assigned to one of three programs between 1991 and 1994. The first was a JOBS program that emphasized the rapid acquisition of employment; the second was a JOBS program that emphasized longer-term training and education; and the third was the traditional AFDC (control group). Two years later, child outcomes were assessed, including cognitive development, academic achievement, behavior, emotional development, health and safety. Assessments consisted of cognitive testing of the children and mother reports (Zaslow, McGroder, & Moore, 2000).

Participation in JOBS had few and small impacts on child development but the pattern of impacts is important when considering school readiness. The effects on behavioral and emotional development were mixed, but, in general, the effects on cognitive development and academic achievement were positive. The job training and education program in particular produced some favorable impacts on cognitive school readiness tests (Zaslow, McGroder, & Moore, 2000). Thus, it can be surmised that maternal participation in job

training and education classes can positively influence poor children's school readiness (at least in the cognitive domain), though effects were small.

Summary: Family Economic Risk

As far as the best interventions for improving the school readiness of children in poverty are concerned, Brooks-Gunn (1995) suggests that "two-generation programs" might be the most effective. Such programs would provide education and work training for poor parents, quality child care, parenting classes and referrals for services. To that list should be added wage supplements to bring incomes above the poverty level, the effectiveness of which has been tentatively shown by the New Hope Project and MFIP.

FAMILY STRUCTURE RISK

Rates of out-of-wedlock childbearing, divorce, cohabitation and remarriage in the United States have risen substantially over the past several decades. Changes in living arrangements, marriage and divorce can cause financial and emotional strain on families with children, and these stressors may have a direct and/or indirect effect on children's well-being. In particular, the experience of multiple transitions in family situations (including frequency of moves) during childhood is associated with an increased probability of repeating a grade (Wood, Halfon, Scarlata, Newacheck, & Nessim, 1993) and lower educational attainment (Aquilino, 1996). Even when living arrangements are relatively stable, children may fare differently depending on how many children are in the family, whether the child's birth was intended and wanted by the parents, whether the parents were younger or older, or whether both parents reside in the home.

This section discusses the effects of family composition on children's school readiness skills. We will cover several topics, including unwanted and unintended pregnancy, close birth spacing, teen parenthood, single- vs. two-parent families, nonresident parents, cohabiting couples and step- and reconstituted families. To date, there are few rigorous, longitudinal studies that specifically address the effects of different family configurations on children's school readiness. Nevertheless, the available evidence indicates that family structure at the time of a child's birth and during the first several years of life will have long-lasting effects on children's development in general, and specifically on children's adjustment to school. Where relevant studies are available (e.g., studies relating family structure characteristics to educational achievement), they will be mentioned below.

Unwanted and Unintended Pregnancy

Women who have unplanned pregnancies are often in poorer health before the pregnancy and are less likely to avail themselves of prenatal care (Brown & Eisenberg, 1995); these circumstances can have negative consequences for life outcomes of the child. In fact, unintended pregnancy has been found to be associated with low birthweight, infant mortality, a lowered likelihood of obtaining immunizations during early childhood, and poor child health (Moore, Manlove et al., 1997). Children who are the result of an unintended pregnancy also have been found to have lower levels of positive emotional expression at age two, and delayed verbal abilities during the preschool years (Moore, Manlove et al., 1997). These children are also at a greater risk for abuse and neglect

(Zuravin, 1991). An analysis of a nationally representative sample of families (the National Survey of Families and Households, NSFH) found that mothers with unwanted births spent less time with their children and were more likely to spank or slap their children than mothers with wanted births (Barber, Axinn, & Thornton, 1999). Furthermore, the same researchers found that, among a second national sample of mother-child pairs followed over 30 years (the Intergenerational Panel Study of Mothers and Children), mothers with unwanted births had lower quality relationships not only with the unwanted child, but also with the rest of the children in the family (Barber et al., 1999). Other researchers estimating sibling fixed-effects models find that most of the negative outcomes reflect characteristics of the women who have unintended births (Joyce, Kaestner, & Korenman, 1997).

There are several populations that deserve targeting in an effort to reduce unwanted and/or unintended pregnancies. One group is teenage women. Current estimates are that more than 80 percent of pregnancies to teen mothers are unplanned. Another group is unmarried couples. Current estimates are that 43 percent of births to unmarried couples are unintended, and 15 percent are unwanted (Abma, Chandra, Mosher, Peterson, & Piccinino, 1997). A third group is men—of all ages. The intendedness of fatherhood may be related to the stability of the marital or cohabiting union between the parents (Furstenberg, 1995), the amount and quality of interaction between father and child (Halle, Moore, Greene, & LeMenestrel, 1998), and whether a non-resident father pays child support (Working Group on Male Fertility and Family Formation, 1997). However, the question of causality is an issue: Is having an unstable union the cause or effect of having an unintended birth? More research is needed in this area to illuminate the answers to these questions. What we do know is, to date, most public- and privately-funded programs to delay unintended pregnancy target women and the few that do extend their services to men tend to focus on adolescent males only (Halle et al., 1998).

The Number and Spacing of Children

Family size has been noted as a strong predictor of children's cognitive and educational status (Blake, 1989). In general, children with fewer siblings tend to have higher cognitive and educational outcomes. In an analysis of six large-scale national studies, Blake (1989) found that the number of siblings was the second most important predictor of educational attainment among white males, after father's schooling. It is thought that advantages exist for children in smaller families due to the extra time and financial resources that parents can devote to each child. A study by Gottfried and Gottfried (1984) found that children between the ages of one and four from small families, compared to their peers in larger families, scored higher on standardized tests of ability and had more enriching home environments, as assessed by the HOME scale.

A recent study has examined the origins of the long-standing association between family size and child cognitive outcomes. Guo and VanWey (1999) used sibling data from the National Longitudinal Survey of Youth – Child Supplement (NLSY-CS) to control for unobserved selection factors and found that family size is no longer a significant predictor of cognitive outcomes. These findings are quite controversial (Downey, Powell, Steelman, & Pribesh, 1999; Phillips, 1999) and additional research can be anticipated. A recent analysis by Rodgers, Cleveland, van den Oord and Rowe (2000)

also used within-family (i.e., sibling) data from the NLSY-CS and also found that family size *per se* is not a significant determinant of children's cognitive abilities. Rather, the authors suggest that it is the strong correlation between maternal and child IQ that may account for the effects attributed to family size in past research, along with the fact that mothers with many children tend also to have lower IQ's than mothers with fewer children. They conclude that low-IQ parents make large families, but large families do not make low-IQ children. While the controversy over the linkages between family size and cognitive ability are important from a scientific and methodological perspective, it should be noted that much more research is needed in this area. For example, as yet research has not examined critical non-cognitive outcomes for children such as health, safety, behavior problems, and emotional well-being and their relation to family size.

Beyond the number of children in the family, the spacing of children is also cited as being important. Close child spacing is related to poorer infant health (Spratley & Taffel, 1981) that in turn may make children more susceptible for learning disabilities and language delays (Bradley, Caldwell, Rock, Casey, & Newlson, 1987). An intervention originally designed to prevent maternal and child health problems has been found to be effective in reducing unwanted pregnancies and delaying second births among first-time, low-income teen mothers. The intervention consists of having a registered public health nurse visit the homes of first-time mothers at regular intervals during pregnancy, and up through the child's second birthday. During the home visits, the nurses cover topics ranging from personal health habits (e.g., reducing cigarette and drug use, adequate diet) to parenting behaviors (e.g., emphasizing sensitivity and responsivity) to home safety.[3] A 15-year follow-up on the original, randomized sample of 400 woman (89% white) in the semirural county of Elmira, NY found that women who received nurse home visitation during pregnancy and infancy had fewer subsequent births (1.3 vs. 1.6) and longer intervals between the first and second birth (65 vs. 37 months) than women in the comparison group who only received free developmental screenings for their children during infancy (Olds et al., 1997). A second randomized trial conducted in a more urban setting (Memphis, TN) with a primarily African American sample and under less controlled circumstances produced remarkably similar results (Olds et al., 1998). It appears that having nurses rather than paraprofessionals conducting the home visits is an important ingredient for program success. A replication of the original Elmira study in Denver, CO compared families visited by nurses and paraprofessionals who were following the same program model. Researchers found that there were significant differences between nurses and paraprofessionals in the length of visits, topics covered during visits and number of program dropouts (Korfmacher, O'Brien, Hiatt, & Olds, 1999). Effects of nurses vs. paraprofessionals on mother and child outcomes are still not available at this time, however.

Timing of Parenthood

The age at which adults become parents turns out to be a contributing factor in child well-being. Several studies have documented that children of teenage mothers compared to children of older mothers have lower levels of cognitive and educational attainment,

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[3] See the later section on *Parent-Child Interactions* for a more complete description of the original demonstration study design, as well as additional effects of the intervention.

lower levels of academic achievement, and higher levels of behavioral problems (Baldwin & Cain, 1981; Broman, 1981; Furstenberg, Brooks-Gunn, & Morgan, 1987; Hofferth, 1987; Maynard, 1997; Moore, Morrison, & Greene, 1997). Other factors (such as human, economic, and social resources) account for much of the variance attributed to teen parenthood (Cooksey, 1997) but not all of it (Maynard, 1997; Moore et al., 1993).

The age of becoming a father also has implications for children's life outcomes. Due to low rates of marriage and high rates of divorce among teenage parents, adolescent fathers have less contact with their children than do older fathers. Several national studies have found that nearly half of young unwed fathers visit their infants at least once a week up through the age of two, but their level of visitation and other forms of involvement slow as their children became preschoolers and diminish precipitously once children enter the elementary school years to the point that only 20 percent of unwed fathers report visiting their school-aged children at least once a year (Lerman, 1993; McLanahan, Garfinkel, Brooks-Gunn, & Zhao, 1998; Mott, 1990). The lower levels of involvement of teenage fathers may be due to their lack of preparedness for the fathering role in terms of both financial and emotional responsibility (Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989). Older fathers (i.e., men who become fathers in their late 30s or more) have been found to be more responsive and affectionate with their children, more helpful with child care and housework and more satisfied with the parenting role than are younger fathers (Coltrane & Ishii-Kuntz, 1992; Cooney, Pederson, Indelicato, & Palkovitz, 1993; Volling & Belsky, 1991). Furthermore, children born to older couples are more likely to be planned and wanted (Brown & Eisenberg, 1995).

To our knowledge, there have been no studies that have looked at the impact of the timing of parenthood on school readiness. However, in the near future we will have several new datasets available that will meet our data needs for this topic. The Early Head Start (EHS) Study and the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B) Study are in the process of collecting data on nationally-representative samples of young children and their families, and following these children through school entry. In addition to gathering data on children's cognitive, social and emotional development, the two datasets will collect information on family history and household composition as well as data on aspects of children's home and child care environments.

Single- vs. Two-Parent Households

Twenty-seven percent of children in the United States live in single-parent households while 68 percent live in two-parent households (U.S. Department of Health and Human Services, 1999). Children living in single-parent households face more challenges with regard to school success compared to children living in two-parent families. For example, children from two-parent households are more likely to get better grades and to have fewer behavior problems than children from single-parent households (McLanahan & Sandefur, 1994; Thompson, Entwisle, Alexander, & Sundius, 1992). Furthermore, Aquilino (1996) found that children born to unmarried mothers who lived exclusively in single-parent households were particularly likely to have low educational attainment. We were unable to locate any experimental or longitudinal, multivariate studies that specifically focused on the impact of single parenthood on school readiness.

The challenges faced by children in single-parent households stem, in part, from economic disadvantage (see section on family economic risk, above). Children growing up in families headed by a single mother are five times more likely than children in two-parent families to be poor (U.S. Department of Health and Human Services, 1999). Indeed, the vast majority of families receiving welfare are headed by a never-married, divorced, or separated mother. Nevertheless, some researchers have found that even after controlling for family socioeconomic status, race/ethnicity, and other background characteristics, children from divorced or never-married households are less likely to complete high school and more likely, as adults, to be in low-wage jobs than children from two-parent households (Amato, 1993; Amato & Booth, 1997). Still, the differences in school outcomes for children growing up with one parent vs. two are relatively small (Zill, Morrison, & Coiro, 1993) and therefore the research should not be construed to suggest that children in single-parent households are doomed for school failure. Similarly, it should not be assumed that all children in two-parent families are better off than children in single-parent families. Children exposed to high levels of marital conflict exhibit higher levels of behavior problems than children who experience divorce or separation (Morrison & Coiro, 1999).

Cohabiting Households

Nearly one-third of all births in the United States occur to unmarried women (Curtin & Martin, 2000), yet not all of these women are raising their children alone. Thirty-nine percent of nonmarital births occur to cohabiting couples (Bumpass & Lu, 2000). Research on cohabiting couples is limited, and rarer still is research that looks at the effects of cohabitation on children in the family. Indeed, we were unable to find any studies that examined the impact of living in a cohabiting household on children's school readiness skills. What we do know from research is that, from an economic standpoint, children living in cohabiting households are better-off than children living in single-parent households without another adult, but they are still not as economically secure as children living in two-parent families (Manning & Lichter, 1996). Because cohabiting relationships in the United States are less stable than legal marriages, and marriages that are preceded by cohabitation are less likely to last than marriages not preceded by cohabitation (Axinn & Thornton, 1992; Lillard, Brien, & Waite, 1995), it is likely that children of cohabiting couples will experience more physical, social, and economic turbulence than other children in two-parent families.

Involvement of the Non-Resident Parent

Because of high rates of nonmarital births, divorce and separation, many children currently reside with only one parent. For the most part, non-resident parents are men.[4] In general, non-resident fathers are less involved in their children's lives than are resident fathers. The research portrays mixed results regarding whether contact between non-resident fathers and their children has a positive, negative or null effect on child well-being (e.g., Furstenberg, Morgan, & Allison, 1987; King, 1994; Peterson & Zill, 1986).

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[4] However, a growing proportion of children today are living with their single or cohabiting father (Brown, 1996; Garasky & Meyer, 1996).

Some of the discrepancies in findings may be due to the inadequacy of most measures to distinguish between positive and negative contact (Halle et al., 1998). However, the research is in general agreement that financial contributions from non-resident fathers are associated with better behavioral, emotional and academic outcomes among children (Furstenberg, Morgan, & Allison, 1987; King, 1994; Knox & Bane, 1994).

Stepfamilies, Reconstituted Families, and Other Family Configurations

Despite the prevalence of divorce and remarriage, there is relatively little research on the impact of stepfamilies and reconstituted families on child well-being. There is even less research that specifically relates these to children's school readiness. One difficulty in conducting this research is tracking the fluidity of changing family configurations. There is some information on the effects of children living with their grandparents; nevertheless, the findings are inconclusive. For children of unmarried mothers, the impact of living with grandparents is mixed. Aquilino (1996) found that in some cases, children of unmarried mothers who also lived with their grandparents had lower school achievement, while others seemed to benefit from a more stable environment that included extra adult monitors and supports.

Summary: Family Structure Risk

The research suggests that children who are the result of a planned pregnancy and who reside in a low-conflict, two biological parent family have, on average, more optimal school outcomes. For those children who reside with one parent, having the non-resident parent remain actively involved in the child's life may be advantageous. Although the research is mixed, it may be fair to hypothesize that children would benefit from contact with their non-resident parent, provided that contact was of a positive nature. It is clearly important that non-resident parents continue to contribute monetarily to their child's upbringing, as financial support from non-resident parents has been found to be a factor in children's school success. Since non-resident fathers tend to diminish their involvement with their children as they reach school age, it may be worth exploring ways to keep men involved (in terms of spending time, having a positive relationship with their children, and providing financial support) at this critical point of their children's development.

Interventions that reduce or delay childbearing among young women and men, and/or increase the spacing between children seem important as well. One particularly promising strategy is to provide first-time teen mothers with home visits from a public health nurse who will provide important information on prenatal care, child development and family planning. Another promising strategy would be to expand outreach to men of all ages for family planning services. There is no clear evidence for the effect of cohabitation or other family configurations on children's school readiness at this time, though these circumstances are related to poorer outcomes on other measures.

THE HOME ENVIRONMENT

The child's home environment is comprised of the interaction that the child has with his or her parents and the cognitive and social stimulation that is present in the household.

The stimulation may come from learning materials such as books and educational games or from toys with which the child plays. The parents' characteristics may also have an effect on the child. For instance, a parent with a high level of education and a strong work ethic may have expectations for higher educational and occupational attainment for the child. A depressed parent may model more negative behaviors. The present section on the child's home environment will discuss those studies that have examined the effects of the home environment on children's cognitive and socioemotional development.

Parental Depression

The depression of a parent, especially long-term, can have adverse effects on a child's behavior and mental health. Hammen and colleagues (1987) conducted a longitudinal study to determine if mother's diagnosis (i.e., unipolar, bipolar, medically ill, and normal) predicted child psychological outcomes of 8- and 16-year-olds. At a six-month follow-up, behavior problems were found to be predicted by maternal depression and the chronic strain that depression can place on the family. It should be noted that, although significant, the effect of depression on child behavior was relatively small. Possibly a longer interval between initial assessment and follow-up would have resulted in stronger associations (Beardsley et al., 1998). Similar results were obtained over a longer period in a study comparing children of bipolar, unipolar and normal mothers from a baseline at 1.5 to 3.5 years to a follow-up at 5 to 6 years of age (Radke-Yarrow et al., 1992). In that study, when mother and psychiatrist reports were combined, maternal depression, regardless of whether it was unipolar or bipolar, was related to disruptive behavior and depression in the child at the follow-up. Although these studies paint a picture of a direct effect between maternal depression and child outcomes, a broad review of the parent depression literature identified parent-child interactions as a possible mediator of child developmental outcomes (Downey & Coyne, 1990). As mentioned in the child health section of this report, interventions targeting the parent's depression (or a two-generation approach in which both the parent and child are treated) may be effective in reducing behavioral problems and depression in the child.

Parent-Child Interactions

The parent-child relationship is the first important, socializing relationship that a child may encounter. Many researchers and policymakers believe that, if changes are sought in child outcomes, interventions should focus on the parent (Dyer Harnish, Dodge, & Valente, 1995). Several interventions directed at parents have been implemented and evaluated. One program, Parents as Teachers (PAT), has been implemented and evaluated in several regions in California. Through home visits from parent educators beginning during pregnancy, PAT seeks to teach parents to be knowledgeable and well-adjusted parents. Wagner and Clayton (1999) reported on two evaluations of PAT. Both evaluations used a randomized experimental design. In the first evaluation, assessing a program serving a predominantly Latino population in Northern California, an experimental group (n = 298) received PAT services, while a control group (n = 199) was untreated. The families in the experimental group were visited an average of 20 times over a three year period. Visits normally lasted 45 to 60 minutes and usually involved the mother and the children in the home. During the visit, the parent educator conducted

periodic screenings of the children's health and developmental trajectory and taught the parent basic parenting skills. In the other evaluation, serving adolescent parents in Southern California, participants received one of four services: PAT program services alone (n = 177); case management services alone (n = 174); PAT plus case management services (n = 175); or no treatment (control group; n = 178). The program services group was offered monthly home visits through the child's second birthday. The services during these visits, which averaged 10 over the two year period, mirrored those in the other program. Case management services took place separate from the home visits. Case managers provided referrals for physical and psychological functioning, as well s for education, nutrition, and environmental risks. The results, overall, produced small and inconsistent gains in child outcomes, such as positive behaviors and cognitive development. However, children in a Latino Spanish-speaking subsample in the PAT groups showed significant gains in cognitive, communication, and self-help development. The most gains in the Latino Spanish-speaking group were from the combine PAT and case management group.

In addition to the Parent as Teachers programs, several other interventions that place paraprofessionals and professionals in the homes of new mothers have been conducted throughout the country, such as Healthy Families America; the Family, Infant, Preschool Program (FIPP); and the Home Instruction Program for Preschool Youngsters (HIPPY). Overall, randomized experimental and quasi-experimental design evaluations of these programs demonstrate improved parent-child interactions, reduced maternal depression and increased cognitive abilities of the children (see Powell, 1993 and the Spring/Summer 1999 edition of *The Future of Children*, for an overview of these projects).

One of the most successful interventions for improving both maternal and child outcomes is the Nurse Home Visitation Program, designed by Dr. David Olds. This program was studied in a series of randomized, control-group studies in three different locations: one semirural county (Elmira, NY), and two urban areas (Memphis, TN and Denver, CO). The first randomized trial was begun in 1977 in Elmira, New York. Four hundred women who were pregnant with their first child were recruited for the study (89 percent were white). Eighty-five percent of the women had one or more of the following risk factors at study entry: low-income, single parent, or younger than age 19. The women were randomly assigned to one of four treatment groups. Families in Treatment 1 were given free developmental screenings of the child at age 12 and 24 months. Families in Treatment 2 received these screenings, plus free transportation for prenatal and well-baby care through the child's second birthday. Families in Treatment 3 were provided the screening and transportation services, and in addition were provided with a nurse home visitor during the pregnancy. Treatment 4 families received all services provided to families in Treatment 3, but the nurses continued to visit the home through the child's second birthday. During the home visits, the nurses covered topics ranging from personal health habits (e.g., reducing cigarette and drug use, adequate diet), to parenting behaviors (e.g., emphasizing sensitivity and responsivity), to home safety. Results of the study indicated significant differences in the level of child maltreatment and child cognitive

developmental outcomes based on receiving a nurse home visitation intervention.[5] Reviews of randomized trials of other home visitation programs indicate that, to produce comparable effects, the interventions must include all the elements that are part of this particular model, including the use of nurses rather than paraprofessionals (Korfmacher et al., 1999; Olds & Kitzman, 1993).

Additional longitudinal research suggests that the emotional quality of the parent-child relationship is an important factor in child outcomes. While longitudinally examining the role of maternal depression on the development of child emotional and behavioral problems in a sample of representative first-grade boys and girls, Dyer Harnish et al. (1995) found that the effect of maternal emotional states on child outcomes were partially mediated by the quality of mother-child interactions. Zaslow, Hair, Dion, Ahluwalia, and Sargent (2000), longitudinally studying the effects of maternal depression on child cognitive and social development, came to similar conclusions. A sample of 351 mothers participated in a welfare-to-work program, and their 3- and 4-year-old children were observed in a two-year follow-up to determine the effects of the program on child and maternal outcomes. In regard to the child outcomes, the investigators found that the effects of maternal depression on child outcomes were mediated by supportive parent-child relationships.

Parenting practices have also been found to moderate[6] parental depression. For instance, the NICHD Early Child Care Research Network (1999) analyzed, longitudinally, maternal sensitivity to child needs as a *moderator* of the effects of maternal depression. Researchers obtained maternal reports of depression from time of the birth of the woman's child until the child was 36 months of age. Observational data of the mother-child interaction was collected from the sample of 1,215 women and their infants. Results supported a moderating effect, showing that high maternal sensitivity predicted better outcomes for those children who had depressed mothers.

Further evidence of the effects of parenting practices can be seen in the child antisocial behavior literature. Parent-child relationships have been demonstrated to have both a direct and indirect effect on child behavioral problems (e.g., Patterson, 1986; Patterson, DeGarmo, & Knutson, 2000). To explain this phenomenon, Patterson (1986) has developed a performance model for antisocial boys, based on data from a predominantly Caucasian American sample. He describes how the interaction of poor parenting practices such as yelling at the child (what Patterson considers "inept discipline") with coercive behavior by the child will result in a downward spiraling of both poor parenting strategies and child coercion. The parenting strategies thus mediate the effects between the child's behavior and later antisocial behaviors for boys. Antisocial behaviors subsequently predict a decline in peer acceptance, child self-esteem, and academic performance. A more recent longitudinal analysis by Patterson, DeGarmo, and Knutson (2000), based on a similar sample, sought to discriminate between hyperactivity and antisocial behaviors in children. Although the initial analysis found hyperactivity to have a strong relationship to boys' antisocial behavior, the relationship disappeared once

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[5] See earlier section on *The Number and Spacing of Children* for additional effects of this intervention.

[6] A *moderator* is an intervening variable that affects the magnitude of the relationship between two variables. A *mediator*, on the other hand, is an intervening variable that links the indirect relationship between two variables.

parent discipline was entered into the equation. The parent's antisocial behavior was also a strong predictor of later antisocial actions of and hyperactive outbursts by the child. The long term effect of child antisocial behavior is demonstrated by the finding that boys' antisocial behaviors have a very strong relationship to the early onset of delinquency.

Analyses of the National Household Education Survey (NHES, a nationally representative sample of households in the U.S.) has found that fathers' involvement both at home and at school is significantly related to children's school success, even after accounting for mother involvement (Nord, Brimhall, & West, 1997). Furthermore, observational studies have noted that paternal praise (as opposed to harsh words or indifference) is associated with higher educational goals, achievement and better classroom behavior on the part of the child (Feldman & Wentzel, 1990; Radin, 1986; Smith, 1989; Wentzel & Feldman, 1993). Although these studies report findings for children already in school (indeed, many studies focus on adolescents), their findings suggest that similar levels of paternal involvement would foster children's transition to schooling.

The Physical and Social Environment (The HOME)

The quality of the physical environment along with the social and emotional interaction with the parent in the home is also important to school readiness (Caughy, 1996; Hu, 1987; Klebanov, Brooks-Gunn, McCarton, & McCormick, 1998; Korenman et al., 1995; Liaw & Brooks-Gunn, 1993; Molfese, DiLalla, & Bunce, 1997; Molfese, DiLalla, & Lovelace, 1996; Teo, Carlson, Mathieu, Egeland, & Sroufe, 1996). In order to assess both the physical and social qualities of the home, an index, the Home Observation for Measurement of the Environment (HOME) was developed (Bradley & Caldwell, 1984). The index measures eight variables within the home that are thought to affect child development: learning materials, stimulation of communicative competence, physical environment, parental nurturance and responsivity, academic stimulation, modeling and encouragement of social maturity, variety in experience and acceptance of the child. This psychometrically sound measure has been used in numerous national, regional and local surveys and studies.[7] A shortened version, HOME-SF, has been used in a number of large-scale surveys with similar findings.

Higher scores on the HOME have been found to predict positive cognitive and social development among children. For instance, a child's HOME score was the single most important predictor of intelligence among Caucasian American children from three to six years of age (Molfese, DiLalla, & Bunce, 1997). Liaw and Brooks-Gunn (1993) conducted an analysis to examine the cognitive development of African American and Caucasian American low birthweight, preterm infants from 12 to 36 months of age. The analysis supported HOME scores, along with neonatal health, and a parenting education and health screening intervention, as variables that discriminated among cognitive

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[7] However, there have been recent analyses that bring the validity and reliability of the HOME into question (Mariner, Zaslow, & Sugland, 1998; Mariner & Zaslow, 1998; Zaslow, Dion, & Sargent, 1998). These analyses show that the reliability and validity of the HOME is not necessarily consistent across ethnic groups in regard to subsequent predicted outcomes. Also, additional observational measures seem to capture more of the unique aspects of mother-child interaction quality than the HOME-Short Form alone.

development groups, with more enriching environments predicting better cognitive outcomes (e.g., high and stable cognitive development being better than low and stable cognitive development or high cognitive development declining to average). HOME scores have also been used in assessing preschool cognitive and verbal abilities of Caucasian American infants (Molfese, DiLalla, & Lovelace, 1996). HOME scores measured at three years accounted for significant and unique variance in predicting cognitive and verbal outcomes at four years in a sample of 41 boys and 53 girls. However, when broken down into subscales, only academic and language stimulation were found to be uniquely predictive.

HOME scores have also been shown to mediate and moderate the effects of other variables in predicting positive outcomes of school readiness. Klebanov and colleagues (1998) found that the HOME mediated the effects of family income and family risk scores on cognitive development at three years of age in preterm low birthweight children. Research has also supported the home environment as a moderator of cognitive outcomes. Academic readiness of school-age children was assessed using National Longitudinal Survey of Youth data to examine the effects of perinatal and post-natal health, family income, maternal education and the quality of the home environment (Caughy, 1996). HOME-SF scores and maternal education, considered as a composite score of the home environment, added unique variance to the model. HOME scores also moderated the effects of poor infant health on cognitive outcomes, with a better home environment tempering the negative effects of poor health. Similar results were found when early cognitive and motor developmental status and home environment (in this case, maternal responsivity to and involvement with the child) at 12 months were examined as predictors of cognitive performance at 24, 36, and 48 months of age (Hu, 1987). High scores on developmental and home variables each predicted general cognitive ability individually and together. When combined with parent-child attachment and child's psychological adjustment in a comprehensive index, HOME scores at 30 months of age predicted math and reading achievement in first, third, and sixth grades (Teo et al., 1996).

Summary: The Home Environment

As can be seen, there are different components of the home environment that can affect child outcomes. Maternal depression, parent-child interactions, and the physical environment all have been found to be related to children's developing cognitive and socioemotional competencies.[8] Results across multiple studies seem to suggest that parenting practices and parent-child interactions might be the best places to direct interventions. Parenting practices mediate the direct effect between maternal depression and cognitive and social outcomes for children. A coercive parent-child relationship encourages deviant child behavior. Even the physical environment in the home may be mediated by parenting practices. For instance, a competent parent may make sure to provide sufficient stimulation and opportunities for the child to learn. This would be in

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[8] There is a dearth of research on father-child interactions. Patterson's research (e.g., 1986, 2000) has focused on mothers, and the parent depression literature has relied on maternal diagnoses. Future research should assess the effects that fathers have on children.

line with one of the three main goals of the National Education Goals Panel: "Every parent in America will be a child's first teacher and devote time each day helping his or her preschool child learn; parents will have access to the training and support they need" (NEGP, 1997a, p. 1). Given the effect that parent-child interactions and parenting practices can have on a child, it appears to be worth investing in giving parents the training and support they need to be their child's first teacher.

SUMMARY

Family-level factors, including family economic status, household composition, and the physical, emotional, and psychological components of the home, are all important for the child's social and cognitive development. Family planning behaviors that increase birth spacing also benefit children's cognitive and physical outcomes. Education-based interventions using well-qualified educators (e.g., public health nurses) to increase the parenting knowledge of mothers have been used effectively in specific populations. Further evidence with more diverse populations, however, is needed. The relatively sparse data on resident fathers precludes us from making recommendations concerning males in the household at this time. However, data suggest that positive contact between non-resident parents (usually fathers) and children may benefit children's cognitive and social development. Furthermore, fathers' involvement with children at home and in their children's schools boosts children's school performance and enthusiasm for school, above and beyond mother involvement.

Early Childhood Care and Education

Services related to early childhood care and education are important in preparing children to be ready for school. It is estimated that 53 percent of all 3- and 4-year-old children are enrolled in early childhood programs including Head Start, day-care centers, and preschools. However, there is a difference in enrollment rates by socioeconomic status—58 percent of families above the poverty threshold enroll their children in programs, compared to 41 percent of those below the poverty threshold (U.S. Department of Health and Human Services, 1999). This is cause for concern because research suggests that poor children particularly may benefit from such programs, and enrollment might even be a necessary precursor for them to begin school ready to learn (Barnett, 1995). Also of concern is the fact that many programs lack quality. Low-quality programs often just meet the routine care needs of children but provide few opportunities for meaningful learning activities or language stimulation (Peisner-Feinberg & Burchinal, 1997).

Quality early child care and education programs can enhance cognitive, emotional and social development, especially among economically disadvantaged preschoolers (Kagan & Neuman, 1997). Participation in programs can lead to short-term gains in IQ scores, better kindergarten achievement, lower rates of grade retention and special education placement and higher rates of high school graduation (Barnett, 1995). In the following section, several studies of early childhood care and education will be summarized and the best practices found in each study will be highlighted.

The High/Scope Perry Preschool Project was conducted in Ypsilanti, Michigan and started in the late 1960s. It included a sample of 123 African-American children born in poverty who were divided into two samples at ages 3 or 4. The control group received no intervention while the experimental group was placed in a high-quality preschool (High/Scope Educational Research Foundation, 2000). The program encouraged *active learning* among children by allowing them to initiate activities and control their environment. Children learned in an environment rich with materials and then reported back to their teachers on what they had achieved. Teachers encouraged children's experiences in the areas of initiative, social relations, creative representation, music and movement, language and literacy, and logic and mathematics. The program also included weekly home visits by teachers in order to discuss and practice activities for parents to carry out with their children. Teachers received curriculum training and supervision, and only five or six students were assigned to each teacher (Schweinhart & Weikart, 1993).

Data were collected on program participants and control group children every year between ages 3 and 11, and then at ages 14, 15, 19 and 27. At the latest assessment, information was gathered from 95 percent of the original participants through interviews, data from schools, social services, and arrest records. The results are striking—71 percent of program participants had graduated from high school compared to 54 percent from the control group. Fifty-nine percent of program participants had received welfare assistance as adults, compared to 80 percent of controls. Fifty-seven percent of preschool participants had out of wedlock births, compared to 83 percent of controls (High/Scope Educational Research Foundation, 2000). Thus, participation in a high-quality preschool program that included a great deal of contact between the home and school produced significant, long-lasting results.

The goal of the Carolina Abecedarian Project was to give high-risk children educational experiences early in life so that they could achieve school success. Between 1972 and 1977, four yearly cohorts were randomly assigned to receive either high-quality child care (a total of 57 children) or no treatment (a total of 54 children). Ninety-eight percent of the children were African American and born to a single mother who had not graduated from high school at the time of the child's birth. The intervention was begun by age 3 months, and children in the treatment group received child care for 6 to 8 hours per day, 5 days per week through kindergarten entry at age 5 (Horacek, Ramey, Campbell, Hoffman, & Fletcher, 1987). Some services, such as nutritional supplements, social work services and medical care were provided to control group families in order to ensure that those were not the only factors accounting for different outcomes between the two groups (Ramey & Campbell, 1991).

The caregiver-to-infant ratio in the child care center was 1:3 initially, and increased to 1:6 as children got older (Campbell & Ramey, 1995). The activities that teachers carried out targeted four areas: cognitive and fine motor skills, social and self-help skills, language, and gross motor skills. Activities were individualized for infants and children based on readiness. As the children reached age 3 or 4, the center became a preschool program with centers for a variety of activities. Activities were designed to seem playful and spontaneous to the children. Teachers were trained to place a special emphasis on language development by speaking with children about their daily lives in a developmentally appropriate way (Ramey & Campbell, 1991).

As early as age 18 months, children receiving the intervention had higher scores on IQ tests, and the difference persisted when children were tested at ages 12, 15, and 21 years. Furthermore, children who received treatment had higher scores on reading and math tests from elementary school through early adulthood. At age 21, 35 percent of experimental participants had graduated from or were enrolled in a four-year college, compared to 14 percent of control participants (Frank Porter Graham Child Development Center, 1999b). Regarding grade retention, by age 15, 31.2 percent of the preschool subjects had been retained, compared to 54.5 percent of the control group. The findings for special education were similar—24.5 percent of the experimental group were placed in special education compared to 47.7 percent of the control group (Campbell & Ramey, 1995). Thus, as with the Perry Preschool Project, the long-term findings indicated long-term positive impacts.

Unlike the preceding studies, the Cost, Quality, and Outcomes Study did not utilize an experimental, random-assignment design. Instead, 401 preschools in four different regions were assessed for quality beginning in 1993, and then the progress of a total of 826 children was tracked through the second grade (Frank Porter Graham Child Development Center, 1999a). The quality of child care centers was assessed by examining the physical environment, the use of teaching practices related to motor, language, cognitive and social development, teacher sensitivity and responsiveness and teaching style (child-centered vs. didactic) (Peisner-Feinberg & Burchinal, 1997).

Quality of child care was correlated with assessments of cognitive skills and language development during the preschool year. Ratings of the relationship between the teacher and individual children were correlated with socioemotional development. Results were found after controlling for familial factors such as poverty and maternal education that might explain differences in outcomes. The strongest effects were found for children at risk for school failure (Peisner-Feinberg & Burchinal, 1997). These effects were seen through the second grade as children who had received higher quality care had better language and math skills, and fewer problem behaviors. Children who had closer relationships with their preschool teachers exhibited better classroom social and thinking skills and language ability at the beginning of elementary school (Frank Porter Graham Child Development Center, 1999a). Thus the investigators found that two aspects of the preschool setting are important for young children as they make the transition into school—classroom practices (materials and activities) and relationships with caregivers.

Perhaps the most well-known early childhood education program is Head Start, a large-scale and publicly funded project serving 3- and 4-year-old children from families below the poverty line. The idea behind its creation in 1965 was to narrow the gap between children who are economically disadvantaged and those who are not in terms of school readiness and long-term academic achievement. Head Start includes many services such as early childhood education and nutrition, and medical, dental and mental health (Lee, Brooks-Gunn, & Schnur, 1988). Collaboration with other service providers and community programs is sought. Another important component to Head Start is parent involvement. Teachers make home visits, and parents are encouraged to volunteer in classrooms, attend parent education classes and enroll in adult education (Mallory & Goldsmith, 1991). There is flexibility in the way that Head Start is implemented—providers can vary services as long as they meet minimum requirements. For example,

they can choose their own curriculum and decide to how best meet the specific needs of particular communities (Advisory Committee on Head Start Research and Evaluation, 1999).

Many varied studies have been conducted on Head Start programs around the country. Early gains on cognitive test scores among those who attend Head Start compared to those who do not attend preschool or other programs have been found (Lee, Brooks-Gunn, & Schnur, 1988). However, several studies suggest that such short-term gains fade with time, but that long-term gains such as higher rates of high school graduation, fewer grade repetitions and lower rates of special education placements accrue to Head Start attendees. Thus, advantages persist in ways that are measured differently than simple cognitive gains, and perhaps initial boosts in test scores set children on a trajectory for better school achievement (Lee, Brooks-Gunn, Schnur, & Liaw, 1990). Currently, proposals are being reviewed by the U.S. Department of Health and Human Services for an experimental impact study of Head Start. As a result of this study, in years to come, more definitive evidence of the influence of Head Start on school readiness will be available.

SUMMARY

What can be learned from such studies about the best practices for early childhood care and education? It is very clear that quality matters. Children need environments in which they are not just provided with basic care but are stimulated to learn. Successful programs emphasize a number of different areas of development including cognitive, language, social and emotional. The studies cited emphasize the fact that small student/teacher ratios are beneficial. Teachers should also work to foster close, caring relationships with their students, an important element in positive socioemotional development. Furthermore, contact between the program and children's homes appears to be important—parent involvement should be sought and encouraged so that parents know what their children are learning and are able to extend early education into their homes.

The Head Start model emphasizes that, along with collaborations between schools and homes, collaborations with community programs and service providers are also important so that children can receive all of the services they need. Finally, it is clear that quality early childhood care and education is most needed for children in poverty—they are the children who benefit the most from it yet they are currently the least likely to receive it.

School Transitional Practices

For five-year-old children, the transition from preschool or home to kindergarten can be an extremely stressful time. Children face new expectations for independence and responsibility, goals that are more formal than those in preschool and larger class sizes. Children begin to have interactions with teachers that focus on their academic progress. They must also learn to negotiate more formalized routines (Rimm-Kaufman & Pianta, under review). The transition to kindergarten is also important when considering how

poverty and minority group membership affect schooling. Stratification begins early and can affect the entire course of a student's education. Many poor and minority students enter school lacking some of the competencies required by the school, creating a mismatch between what children know and what the school expects. This sets certain students on a trajectory for school failure (Entwisle & Alexander, 1993). Also, despite the fact that the transition to kindergarten is a critical period in children's lives, many schools do not have specific guidelines in place. Furthermore, little research has been done on what practices are best under what circumstances. In the following section, recommended transition practices will be summarized, along with the supporting evidence that is available.

The transition to kindergarten involves connections between many different spheres including individual children, families, schools and communities. In order to facilitate a successful transition, the connections between the spheres must be fostered (Rimm-Kaufman & Pianta, under review). To begin with individual children, if a child possesses certain characteristics and experiences, the transition into elementary school is likely to be easier. Social skills, including play behavior, peer group entry strategies and communication skills, have been found to be important. The development of such skills can be facilitated by interactions with peers before school entry, either through parents' creation of chances for their children to interact with other children or through preschool experience (Maxwell & Eller, 1994). Preschool can also have an impact on cognitive development (see section on early child care and education). Entwisle (1995) suggests that cognitive gains can aid in the transition to school by helping children be placed in higher ability groups and creating greater teacher expectations, setting children on the track for continued success.

The active role that schools take when children are transitioning, and even before the transition begins, is essential. One recommended practice is contact between kindergartens and preschools (Smolkin, 1999). Kindergarten teachers should visit the preschools their students will be coming from in order to understand the curriculum and to get to know their future students through interactions with them and through preschool teachers' reports. Kindergarten teachers can then begin planning for individual students before they enter their classrooms, helping to ease the transition (NEGP, 1998b). Another way to build connections between preschool and kindergartens is by arranging for preschool children to visit the kindergartens they will be attending. If children know what to expect, they might feel less anxiety early in kindergarten. The effectiveness of this practice was demonstrated by the Head Start Transition Project (Kagan & Neuman, 1998, details below).

If connections between kindergartens and preschools are important, perhaps connections between schools and homes are even more so, especially because not every child attends preschool. The Goal 1 Ready Schools Resource Group suggests that schools should reach out to families well before children start school (NEGP, 1998b). Practices can include written or personal communications to parents about the school and steps they could be taking with their children, such as reading to them. Other options are home visits by teachers or principals or orientation sessions before the school year begins. It is recommended that practices should continue after school starts with family visits to schools, the solicitation of parent volunteers in classrooms and teacher visits to homes

(Smolkin, 1999). When the connections between schools and homes are strong, parents know what their children are learning and can support the development of that new knowledge in their homes (Melton, Limber, & Teague, 1999).

Several studies have demonstrated the effectiveness of school-home connections during the transition to kindergarten. The Head Start Transition Study, found that the more frequently kindergarten teachers used certain transition practices, the lower child stress was during the first month of school. Practices included training parents to use their rights and responsibilities in schools, creating support groups for parents and distributing book lists and recommending activities for parents to carry out with their children during the summer before kindergarten (Kagan & Neuman, 1998). Another program called On Board Early is used in Baltimore County, Maryland, and serves families during the transition to both preschool and kindergarten. Teachers maintain communication with parents through conferences and logs that pass back and forth. Trained, specialized staff members are hired as liaisons, and they make home visits and suggest activities to parents to carry out with their children. Although the direct effects on children as they transition have not been reported, investigators have found that On Board Early has led to greater involvement by parents in their children's early literacy and closer parent-teacher relationships during the transition into school (Swick et al., 1997).

Connections between schools and community resources should be added to the interplay between children, homes and schools. If schools are connected to health and social services, teachers can respond to the individual needs of their students, helping to ease students' transitions into kindergarten (NEGP, 1998b). Such connections can also serve as a useful means for educators to find and contact the parents of young children who are not enrolled in preschool as a way of reaching out to them before they enter kindergarten. Furthermore, connections with community organizations would allow educators to help more easily children in transient or homeless situations receive the services they need. Through connections between children, parents, schools and community organizations, the transition into kindergarten can be made easier, setting children on a trajectory for continuing school achievement and positive outcomes.

Another important issue in the transition to kindergarten is age of entry. There are certain researchers and educators who believe that school readiness is based on biology, and that children have inner clocks for development. Based on this reasoning, if children are too immature for school at age five, they simply need to be held out for a year—a practice called *redshirting*. Redshirting has been quite common, even among parents who hold their children out of kindergarten for a year simply to give them an edge over other children. The practice has been found to lead to the acceleration of expectations in kindergarten, creating classrooms that are developmentally inappropriate for the 5-year-olds they are supposed to serve (May & Kundert, 1997). The necessity of redshirting is not supported by the evidence. Gullo and Burton (1992) compared older and younger kindergarten students and found that there is no difference in children's development or readiness for first grade at the end of kindergarten based on age. The finding suggests that any differences between children that are present at the beginning of kindergarten can be alleviated by the end of the year.

May and Kundert (1997) espouse the view more commonly held today that development is not based solely on biology, but that learning depends on experience and the learning

environment. Therefore, the school must accommodate to the child, no matter what his or her developmental stage. One approach used by some schools has been to place children who are found to be unready for kindergarten or first grade in modified classes. This creates an extra year of schooling for children as it becomes either an extra year of pre-kindergarten or a half step between kindergarten and first grade. However, the evidence does not support the practice (both in terms of academic skills and achievement and social, emotional and behavioral outcomes) and suggests that developmentally immature children benefit the most from being in regular classrooms (May & Kundert, 1997). This shows that the definition of school readiness should be broad enough to include children at varying stages of development. Because all children are ready for school, except for those with extreme developmental disabilities, it is necessary for schools to have in-depth, careful screening programs and individualized services for children with serious problems. This raises another pressing concern about school transition practices—assessment.

As discussed earlier, assessment at school entry can serve four purposes: to plan teaching by finding out what children already know and what they need more help in; to identify children with special needs; to evaluate programs and monitor trends; and to hold schools and programs accountable (NEGP, 1998a). Problems arise when tests intended for one purpose are used for another. Furthermore, tests are often used inappropriately for identifying children to hold out of kindergarten and tracking children into ability groups. Such practices can be dangerous because tests are often not accurate with young children as they develop and change at such a rapid pace. For example, Pianta and McCoy (1997) found that assessments at kindergarten entry were not very predictive of outcomes such as grade retention and standardized test scores in the third grade. Another danger of using assessments to make important decisions about children is that low scores are most often found for poor, minority children (Ellwein, Walsh, Eads, & Miller, 1991). Such children are the ones who benefit the most from a stimulating classroom experience and are not helped by being held out of kindergarten for a year or by being placed in low-ability groups or classes.

The Goal 1 Early Childhood Assessments Resource Group (NEGP, 1998a) suggests that assessments should always be beneficial for children or for programs. They should be used for a specific purpose, be age-appropriate and be linguistically appropriate. Parents and teachers should be used as sources of information. Educators who use assessments to make decisions about individual children should recognize that tests might not be reliable until children are in third grade or older. Assessments should be used as a first step to identify students who might not be ready for school, but then further testing should be carried out so that informed decisions can be made. Then individualized services, rather than simply holding children out of kindergarten, should be designed.

Summary

Although little experimental research has been done on specific school transition practices, recommendations can be made using theory based on the findings that do exist. There should be contact between kindergartens and preschools so that kindergarten teachers can plan for individual students and so that children know what to expect during the transition. There should be contact between schools and homes, both before and after

entry into school, so that parents can be actively involved in their children's education. There should be connections between schools and community resources so that children can receive the services they need as soon as possible. Regarding entrance age, little evidence has been found to support the practice of holding children out of kindergarten for a year, and the effects can be detrimental, especially for poor and minority students. Finally, assessments should be careful and in-depth when being used to make important decisions about individual children. Tests designed for one purpose, such as evaluating the effectiveness of a specific program, should not be used for another purpose, such as choosing to place a child in special education. A smooth transition into kindergarten and formal schooling can help set young children on a course for academic achievement and success.

Emergent Literacy: Literacy Practices in Family and Early Childhood Care and Education Settings

Emergent literacy refers to the earliest signs of interest in and abilities related to reading and writing. According to Whitehurst and Lonigan (1998), "emergent literacy consists of the skills, knowledge, and attitudes that are presumed to be developmental precursors to conventional forms of reading and writing and the environments that support these developments" (p. 849). Emergent literacy skills include such things as vocabulary, the ability to rhyme and identification of letters of the alphabet (Whitehurst, Epstein, Angell, Payne, Crone, & Fischel, 1994). The development of such skills is dependent on early literacy experiences in the home and in child care settings. Emergent literacy levels at kindergarten entry are a good predictor of reading ability throughout the course of a child's education (Whitehurst et al., 1994), although it is far from true that nothing can be done to help children who enter kindergarten without such skills. Given the continuity of literacy skills from early childhood through later schooling, and given the current number of children reading below grade level, it is clear that exposure to literacy activities and the development of emergent literacy skills are important for later school success. In this section, the components of emergent literacy will be described, as will factors associated with both positive and negative emergent literacy outcomes at kindergarten entry. Finally, several promising possibilities for early intervention will be highlighted.

Emergent Literacy Skills

Many skills are prerequisites for learning to read successfully. An important early skill is knowledge of the letters of the alphabet, which is one of the strongest predictors at school entry of later literacy success (Whitehurst & Lonnigan, 1998). Knowing letters and the sounds associated with them (phoneme-grapheme correspondence) is necessary for "sounding out" words as young children begin to read. Having a well-developed vocabulary is also important—if a child is able to decode a word but cannot match it to a word in her vocabulary, she will be unable to obtain any meaning from what she is trying to read.

Another important factor is phonological awareness, which is the ability to perceive spoken words as sequences of sounds. It includes the ability to segment words into

syllables and the ability to segment syllables into individual sounds (phonemes). Phonological awareness is evidenced in young children's rhyming and alliteration (Gunn, Simmons, & Kameenui, 2000).

Another component of emergent literacy is awareness of print, which has to do with a child's knowledge of the forms and functions of print. Children learn that print conveys meaning and that it can carry a story (Gunn, Simmons, & Kameenui, 2000). They also learn the conventions of print—for example, print moves from left to right and top to bottom, there is a difference between pictures and print, punctuation is necessary and meaningful, and there is a reason for spaces between words (Whithurst & Lonigan, 1998).

Finally, although early writing skills will not be a main focus of this section, it should be noted that they are an important part of emergent literacy skills. A sign of early interest in writing is scribbling, and learning to write progresses from the production of letter-like forms (that can be distinguished from pictures), to letter strings, to "invented" spelling (e.g., writing "kt" for "cat"), to conventional spelling (Whitehurst & Lonigan, 1998).

Early Experiences Associated With the Presence or Lack of Emergent Literacy Skills

What factors are necessary in children's early experiences to ensure that they begin kindergarten with the set of skills they need in order to learn to read successfully? Children who live in homes where reading and writing are common and valued usually experience success with reading as they begin school (Halsall & Green, 1995). Young children need experiences that foster motivation for reading and that provide exposure to books. They need opportunities to learn letters and to learn about the internal structure of spoken words (National Research Council, 1998). They also need the opportunity to build their vocabularies through rich verbal interactions.

One aspect of the home environment that has received much well-deserved attention is parents' reading to children. Shared book-reading affects emergent literacy and reading skills at older ages. Other important factors are the number of children's books in the home and the number of trips to a library (Whitehurst & Lonigan, 1998). Bus, van Ijzendoorn and Pelligrini (1995) conducted a meta-analysis of the empirical evidence related to the amount of parent-preschooler reading, and found that shared book-reading is related to such outcomes as language development, emergent literacy and reading achievement. However, parent-preschooler reading has a larger effect on emergent literacy than on subsequent reading achievement. The authors suggest that parent-child reading is necessary for the start of reading instruction in school, but that other factors (such as the quality of reading instruction within schools) becomes more important over time.

However, many researchers have suggested that not just the *amount* of parent-child reading but the *quality* of reading is important. Parents whose children learn to read more easily do not simply read to their children but ask questions, help their children relate stories to their own lives and help them learn to predict events (Halsall & Green, 1995). Whitehurst calls this "dialogic reading," whereby parents use questions to make children

active participants, not just passive listeners (Whitehurst et al., 1994). (See Interventions section for more details on the quality of book reading.)

Certain risk factors are associated with more limited emergent literacy skills, leading to difficulties in learning to read. These risk factors include familial poverty, living in a low-income neighborhood, limited proficiency in English, hearing impairments, language impairments, low parental education and parental illiteracy (National Research Council, 1998). For example, if parents cannot afford to buy books, they cannot provide a literacy-rich environment for their children. Low-income families may also experience barriers to library use because of inconvenient locations and restrictive book-lending rules (White Otto, 1993). Furthermore, low-income parents are often fearful of checking books out of libraries because they are unable to pay for lost or damaged books (Washington, 2000).

Limited proficiency in English is another serious risk factor, although it will not be of major focus in this review. Many children in the United States are classified as "English Language Learners" (a language other than English is their first language). There is much debate about how to teach such children once they enter school—do you immerse them in English, teach them in their native language first, or try to use a bilingual approach? There is some evidence that English is learned more rapidly by non-native speakers if they learn their native language first. However, much more research is needed in this area before firm conclusions can be drawn (Tinajero, 2000).

In the presence of risk factors such as familial and neighborhood poverty or low levels of parental education, child care and preschool settings may be especially crucial. Teachers must be trained in language and literacy instruction in order to create the literacy-rich environments some children lack at home (National Research Council, 1998).

The rest of this review will focus on promising emergent literacy interventions, ranging from direct interventions with families to improving early childhood care and education literacy environments and practices.

Family Interventions

Based on the evidence described above, it is clear that children whose parents read with them have better-developed emergent literacy skills and an easier time learning to read once they enter school. If parents cannot buy or borrow books, perhaps an intervention that gives books to families living in poverty would be effective. One example of such an intervention is Reach Out and Read (ROR), which is a pediatric literacy program. Pediatricians give patients between the ages of six months and five years books to take home at every check-up. They also encourage parents to read aloud to their children. Another component of the program is volunteer readers in clinic waiting rooms who read aloud to children, modeling for parents the techniques of reading with their children (Reach Out and Read, 2000).

An evaluation of ROR was conducted with 205 low-income families with 5- to 11-month-old children. A total of 106 families were randomly assigned to receive the intervention, and the rest received no intervention. Parents were interviewed after their children had an average of 3.4 well-child visits. A total of 153 families were included at this point, and toddlers were 18.4 months old, on average. Parents were asked if their

children understood or said each of 100 words. Family literacy orientations were measured by seeing if parents mentioned reading aloud as one of their child's favorite activities, or as one of their own favorite activities with their child. Compared to the beginning of the study, intervention families had a 40 percent increase in literacy orientation, while control group families had a 16 percent increase. Vocabulary scores were higher for older intervention toddlers (18-25 months old), but not younger toddlers (13-17 months old). Furthermore, the difference in *amount* of reading was also significant—intervention families averaged 4.3 days per week, while control families averaged 2.8 days per week (High, LaGasse, Becker, Ahlgren, & Gardner, 2000).

Thus, the effects of ROR were generally positive, but it should be noted that the study used parent reports, and there were no direct assessments of children's vocabulary and families' literacy activities. Parents were not told that their children's emergent literacy skills and activities were being studied and were asked a variety of questions in order to hide the researchers' true intent. However, it is conceivable that they knew literacy was being assessed from the fact that they were given books. This might have led them to give answers they thought were desirable (i.e., "Yes, my child knows those words," or "My child's favorite activity is to be read to"). Furthermore, the duration of the study was very short. The effects on emergent literacy skills (other than vocabulary) are not known and need to be explored. Pending more direct, long-term assessments of the literacy development of children in the program, ROR should be considered a promising practice.

Given that the quality of shared book reading, not just the amount, is important, it would seem that parent education in literacy activities with their children would be a useful endeavor. There are several ways to go about reaching parents. One would be through visits to pediatricians (as described in ROR), and another would be through library outreach programs. The role of early care and education settings is also important. Teachers can do such things as teach reading strategies through modeling, home visits and videotapes. They can hold parent meetings and classes, or create a classroom library of books that can circulate to homes (Halsall & Green, 1995).

Another way is through home visitation programs, which can focus on numerous aspects of child development. The Home Instruction Program for Preschool Youngsters (HIPPY) is an example of a home visitation program that serves families with 4- and 5-year-old children. It consists of home visits by paraprofessionals and meetings of groups of parents in order to teach parents how to carry out educational activities with their children so that they will be ready for school. Parents are given books and activity packets to use with their children, and are instructed to work for 15 minutes each day. The activity packets are designed to improve language and critical thinking skills, such as talking about a text and vocabulary building (Baker, Piotrkowski, & Brooks-Gunn, 1999).

Evaluations of HIPPY have shown that it achieves mixed results. For example, in a study in New York state, a total of 182 families in two different cohorts were randomly assigned to receive the intervention or to be in a control group. The intervention families were in HIPPY for two years, and children in both the experimental and control groups were in high-quality, full-day preschool programs during the first year and kindergartens the second year. In cohort I, HIPPY children performed better than control group children on measures of cognitive skills at the end of kindergarten and on a standardized

reading test at the end of first grade. However, *none* of these effects were found for cohort II. In trying to determine what could have caused such different outcomes for the two cohorts, the authors posit that varying levels of parent involvement were to blame. In home visitation programs, attrition, canceled appointments with home visitors, lack of (or waning) enthusiasm and not sticking to the prescribed schedule of parent-child activities can be problems. The authors suggest that levels of parental involvement need to be carefully documented in future evaluations of HIPPY (Baker, Piotrkowski, & Brooks-Gunn, 1999). While home visitation programs are promising as a means of increasing a parent's ability, confidence and desire to help her child develop emergent literacy skills, ways to foster enthusiastic parent participation must be considered in order to implement successful interventions.

Training parents in "dialogic reading" has been shown to be a successful, less time-consuming intervention. In an intervention conducted by Whitehurst, preschool teachers and parents were trained via video and role-playing to use a specific style of shared book reading with children that involves asking questions to make children active participants. Parents' book reading was particularly effective in improving language development (Whitehurst & Lonigan, 1998). (See a full description of the study below in the Early Childhood Care and Education Interventions section.)

A serious risk factor to young children's emergent literacy is low levels of parental education and literacy. Intergenerational family literacy programs are designed to address the literacy needs of entire families—both parents and children. Family literacy programs integrate early childhood interventions, parenting skills education and literacy and job training for parents (Whitehurst & Lonigan, 1998). Even Start is a large-scale example of a government-sponsored family literacy program. It was authorized in 1989, and its main services include adult basic or secondary education and literacy programs, assistance for parents to promote their children's education, and early childhood education. It also includes support services such as transportation, child care, health care, nutrition services, referrals for counseling and employment services (St. Pierre et al., 1998). While it is a nation-wide program, local flexibility is allowed so that individual programs can meet local needs, draw on available program models and work with existing service providers (St. Pierre et al., 1993).

Several national evaluations of Even Start have been conducted, and the results of the first were published in 1993 (St. Pierre et al., 1993). (The most recent study is less useful—at least in terms of outcomes, but not program descriptions—due to its non-experimental design; see Tao, Gamse, & Tarr, 1998). As part of the 1993 study, 200 families in ten sites were randomly assigned to participate in Even Start, or to a control group. The short-term outcomes for children and adults were investigated. For children, Even Start resulted in higher scores on a test of school readiness (the PreSchool Inventory), but there were no effects on vocabulary or emergent literacy skills. For adults, Even Start resulted in higher rates of GED attainment, but the effects on literacy skills depended largely on the intensity of the program and the number of hours of participation. The only impact found on the home environment was an increase in the number of reading materials in the home (St. Pierre et al., 1993). Thus, the results were mixed, but perhaps an explanation lies in the fact that the intensity of programs and the degree of family involvement were highly variable. For example, in a later study of 605

programs, Tao, Gamse and Tarr (1998) found that the number of home visits ranged from none to 150 per year. Furthermore, 40 percent of families dropped out for reasons other than program completion. The National Research Council (1998) suggests that in order for family literacy programs to work, four features are crucial: participation must be ensured through adequate support services; the curriculum must be meaningful and useful; the staff must be stable and capable; and there must be adequate funding. If program intensity is increased and a high degree of family participation is ensured, perhaps future results of Even Start will be stronger.

In summary, there are a variety of promising interventions to help families develop children's emergent literacy skills. They include giving books to families, teaching parents how to read effectively with their children (through pediatricians, preschool and child care settings, and home visitation programs), and family literacy programs. The limitations of home visitation and family literacy might be overcome by ensuring parental participation and the intensity of intervention. Each approach needs further experimental evaluation, but, to some degree, they all appear to help parents develop children's early literacy.

Early Childhood Care and Education Interventions

The literacy environment and activities in a child care setting can make important contributions to emergent literacy, especially if a young child does not come from a home that supports literacy development. Several aspects of early childhood care and education settings are important, including the amount of print in the environment (both the number of books available and print posted around the classroom). Preschool classrooms with play settings that contain print and where children are encouraged to interact with it are associated with better emergent literacy (Neuman & Roskos, 1993). The frequency and types of interactions between teachers and children are also important. The amount and quality of one-on-one or small group interactions is highly related to measures of language development, underscoring the importance of small teacher to student ratios (National Research Council, 2000).

Another consideration in early childhood care and education settings is the activities and curricula that teachers adopt in order to foster emergent literacy and early reading. Emergent literacy activities in classrooms fall into two broad categories—book reading and focusing on sounds and letters (i.e., learning the letters of the alphabet or playing rhyming games) (Whitehurst et al., 1994). Just as at home with parent-child shared book reading, the quality of group book reading in child care settings is important. Teachers should encourage children to be engaged and thinking during group book reading. Training in phonological awareness and teaching letter-sound knowledge have also been shown to help children learn to read. Among other things, phonological training helps children learn to detect rhymes, categorize sounds (e.g., "Which word is different: mop, top, pop, can?"), and segment words into phonemes (National Research Council, 1998). This sort of phonologically-based instruction is designed to help children with their decoding skills. It stands in contrast to whole language instruction, by which children are taught to focus on the meaning of text when learning to read, and to use context to figure out unfamiliar words. Evidence suggests that the whole language approach is effective only when combined with phonics instruction (Whitehurst & Lonigan, 1998).

Whitehurst et al. (1994) conducted an evaluation of an intervention for early childhood settings that uses dialogic reading and the teaching of the phonemic structure of language. A total of 167 four-year olds in Head Start were randomly assigned to either a classroom with an emergent literacy add-on curriculum or one with an unaltered Head Start curriculum. Seven classrooms were included in the intervention condition, while 8 were included in the control condition. The add-on curriculum included dialogic reading, whereby children are made active participants in book-reading through questioning by the adult. A teacher read a book to a group of four children three to five times per week, and parents also read to their children using the same books. Parents and teachers were trained via a video, followed by role playing and discussion. The other component of the curriculum was "Sound Foundations." A new letter was introduced to the class every week, and activities using that letter were conducted, such as asking children to point to objects on a poster that begin with that letter, and coloring pictures on a worksheet of things that begin with that letter.

The intervention had substantial effects on writing and print concepts, but effects on measures of language were only found for children whose parents were actively involved in book reading with their children. One-on-one interaction appears to be important, so it is extremely useful to train parents as part of emergent literacy interventions in child care settings (Whitehurst et al., 1994). A limitation of the study is that it included two separable interventions. Dialogic reading and Sound Foundations should be investigated separately, before firm conclusions can be drawn.

Another study of quality of reading conducted in New Zealand looked at three different styles of adult book reading to children. The study did not utilize an experimental design, so the results should be viewed with caution, but this study does shed some light on quality of book reading. Fifty 4-year-olds were read to two or three times per week for six weeks using one of three styles, and, in addition to outcomes, children's initial skill levels were measured. In the "describer style" condition, adult readers asked children to describe and label pictures. In the "comprehension style," the focus was on story meaning and making predictions about events. In the "performance-oriented style," reading was uninterrupted, and discussion was confined to before and after the story. The describer style improved receptive vocabulary scores, but children with higher initial vocabulary levels benefited more from the performance-oriented style. The authors suggest that children's initial abilities should be taken into account—younger children or those with less-developed vocabularies may benefit from less-demanding styles of reading, while those with well-developed vocabularies (and/or low comprehension abilities) may benefit from more performance-oriented approaches (Reese & Cox, 1999). The results are useful in terms of both parent-child and teacher-child interactions.

Summary

Taken together, the aforementioned studies suggest that in early childhood care and education settings, a combined approach of child-engaging book reading and phonological training is effective in improving emergent literacy skills. Furthermore, child age and development should be taken into account in the style of reading and types of questions asked of children during shared book reading. It is also clear that parent involvement is crucial. Teachers can do a great deal to encourage parents to read to their

children, and to teach them effective strategies. Finally, as noted earlier, having a rich literacy environment and frequent, quality teacher-child interactions are also important to early literacy development.

As for family-based interventions, promising practices include providing books for families living in poverty and teaching parents effective interactive reading styles to use with their children. These practices can possibly be carried out by pediatricians, preschool teachers, child care providers or community organizations. Other practices that have received mixed results are home visitation programs and family literacy programs. The available evidence suggests that both approaches can be effective if adequate levels of parental access and enthusiasm are ensured.

Community/Neighborhood Factors

According to the ecological framework of development (Bronfenbrenner, 1989), child outcomes are not only influenced by proximal contexts created by interactions with family members and friends, but also by more distal contexts such as the neighborhood environment or cultural milieu. Although historically the family and early child care environments have been subject to close scrutiny by researchers interested in school readiness, recently the neighborhood context has become a subject of interest to both researchers and policymakers alike. However, research that addresses the effects of the neighborhood on young children's school-related competencies is limited to a few, relatively recent studies, and the processes by which neighborhoods influence young children's development have not yet been carefully verified (Chase-Lansdale, Gordon, Brooks-Gunn, & Klebanov, 1997; Gephart, 1997). Nevertheless, there is a well-developed theoretical basis for the study of neighborhood effects on young children's lives.

Theoretical Perspectives on Neighborhood and Community Influence

There are at least five theoretical perspectives that may explain how neighborhoods and communities affect child outcomes (see Jencks & Mayer, 1990, and Gephart, 1997 for more comprehensive descriptions; also Duncan & Raudenbush, 1999). *Contagion* theories suggest that an individual's behavior is largely influenced by the behavior of one's peers. This theory is usually used to explain the spread of problem behaviors among children within a neighborhood, but could just as easily explain the spread of good outcomes among neighborhood children. Child outcomes have also been hypothesized to result from social comparisons with one's neighbors and classmates. A negative self-appraisal (compared to one's neighbors or classmates) is hypothesized to lead an individual either to give up (e.g., drop out of school) or try harder. These theories have been termed *relative deprivation* theories (Jencks and Mayer, 1990). *Competition* theories suggest that poor child outcomes are an outgrowth of "needy" families competing for scarce neighborhood resources (Garbarino & Sherman, 1980). In contrast to the negative connotations of the former theoretical perspectives, *collective socialization* theories emphasize the positive influences of neighborhoods. Collective socialization suggests that neighbors can supplement the socialization efforts of parents

by serving as role models and monitors of children. Finally, explanations that emphasize the importance of public and private services in the neighborhood are called *neighborhood resources* theories (Chase-Lansdale et al., 1997). To date, very few studies have attempted to test experimentally the explanatory power of one theoretical perspective against the others (but see Chase-Lansdale et al., 1997, for a recent effort). As will be described in the sections that follow, the collective data appear to favor *a combination of collective socialization and neighborhood resources* as the best description of neighborhood influence on children and families.

The majority of studies looking at neighborhood effects can be categorized as focusing either on community-level *economic factors* or community-level *organizational factors*. For the remainder of this section, we will review the existing evidence regarding the linkages between these two forms of community influence and school readiness.

Community Economic Factors

Neighborhood poverty has been identified as a harmful influence on child and youth outcomes, including school readiness and long-term academic attainment (Brooks-Gunn, Duncan, & Aber, 1997; Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Ensminger, Lamkin, & Jacobson, 1996; Garner & Raudenbush, 1991; Klebenov et al., 1998; Ladd & Ludwig, 1997). For example, children in high poverty areas are at a greater risk for low birthweight, infant mortality, child abuse, behavior problems, teen pregnancy and school dropout (Garner & Raudenbush, 1991; Gephart, 1997). Because economic disadvantage is highly correlated with other forms of disadvantage found in neighborhoods (e.g., high crime, overcrowding, racial segregation), it is not always easy to partial out what proportion of influence neighborhood poverty *per se* has on child outcomes. Furthermore, the pathways through which neighborhood poverty affects child outcomes are not always clear (Chase-Lansdale et al., 1997).

Several recent studies have tried to determine the effects of community economic factors on child outcomes, and the mechanisms by which these factors affect outcomes. However, a review of the neighborhood literature published over the past 20 years indicates that there are only a handful of studies that have focused specifically on child outcomes during early childhood – and all of these studies were conducted in the past eight years (see Brooks-Gunn, Duncan, & Aber, 1997). Four studies were conducted by Brooks-Gunn and her colleagues (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Chase-Lansdale et al., 1997; Duncan, Brooks-Gunn, and Klebanov, 1994; Klebanov et al., 1998), and two by Coulton and her colleagues (Coulton, Korbin, Su, & Chow, 1995; Coulton & Pandey, 1992). (These latter two studies will be discussed in the section on community organizational factors.)

Brooks-Gunn, Duncan, Klebanov and Sealand (1993) used a sample of 894 low birthweight (LBW) infants (489 black, 304 non-Hispanic white, 101 Hispanic) from the Infant Health and Development Program (IHDP, reviewed earlier in this paper) to investigate the influence of neighborhood poverty and neighborhood affluence on children's cognitive and behavioral functioning at age three. Measures of cognitive ability in young children are highly predictive of later school success (Baydar, Brooks-Gunn, & Furstenberg, 1993; Brooks-Gunn, Guo, & Furstenberg, 1993). Similarly, behavior problems in early childhood are highly correlated with behavior problems at

school age (Duncan et al., 1994). Neighborhood-level information from the 1970 and 1980 census was linked to the addresses of the children at study entry. Analyses indicated that, when no family characteristics were included in the model, strong neighborhood effects were found for both IQ and behavior problems. However, when family socioeconomic status was taken into account, the neighborhood effects on behavior problems disappeared, though the effect on IQ remained. Furthermore and most importantly, additional analyses determined that it was the *presence of relatively affluent neighbors* (percentage of families with incomes over thirty thousand dollars in 1970 or 1980) rather than the absence of poor neighbors that was associated with higher IQ scores. Analyses also indicated that neighborhood effects were mediated by the home learning environment. (That is, what parents did in the home explained a substantial proportion of the variance found for neighborhood differences.)

Another study by the same team of researchers (Duncan et al., 1994) and using the same sample from the IHDP looked at the effects of family and neighborhood characteristics on the cognitive and behavioral functioning of five-year-olds. Again, they found that the presence of more affluent neighbors was associated with higher IQ scores. They also found that the presence of poor neighbors was associated with more externalizing problem behaviors (such as yelling, screaming, hitting or otherwise "acting out") at age five, over and above what was explained by family characteristics (i.e., family income, family structure, maternal education, age and ethnicity).

Next, Brooks-Gunn and her colleagues (Chase-Lansdale et al., 1997) tested the hypothesis that neighborhood influences increase with child age. Specifically, they suggested that as children entered school, their exposure to neighborhood influences would increase and the impact of these neighborhood effects would be more pronounced than during the preschool years. In this study, they compared preschool-aged (3- and 4-year-old) and early school-aged (5- and 6-year-old) children in two different datasets: the IHDP and the National Longitudinal Survey of Youth – Child Supplement (NLSY-CS). The NLSY is a longitudinal study (begun in 1979) of a nationally representative sample of over 12,000 youth. In 1986, assessments were begun (on a biennial basis) to collect data about the children born to the female participants of the NLSY. Although the original sample of youth were representative of all 14- to 21-year-olds in the United States in 1979, the children of the female respondents are not representative of all U.S. children. Indeed, the children assessed in the earliest waves of the NLSY-CS were disproportionately children of poor, minority teenage mothers.

Due to the relatively small number of Hispanic children in the IHDP, participants in this study were limited to non-Hispanic blacks and non-Hispanic whites (N=793 and 1,579 for IHDP and NLSY-CS, respectively). As with the previous studies conducted by these researchers, the child outcome measures were cognitive and behavioral functioning. The instruments used to measure these outcomes varied with the age of the child and with the dataset, but all were age-appropriate, standardized measures. Five measures of neighborhood characteristics were assessed, based on the work of the Social Science Research Council Working Group on Communities and Neighborhoods: (1) presence of impoverished neighbors, (2) presence of affluent neighbors, (3) male joblessness, (4) concentration of families within the neighborhood, and (5) ethnic diversity within the neighborhood.

Results of regression analyses indicated moderate support for the hypothesis that neighborhood influences increase with age. As in previous studies, the presence of affluent neighbors was found to be associated with better cognitive outcomes among children. But the comparison of older and younger children indicated that the presence of affluent neighbors was associated with multiple cognitive measures among 5- and 6-year-olds (and across both datasets) but with only one measure of cognitive functioning among 3- and 4-year-olds (and only in the IHDP). The concentration of findings for the older age group was seen as support for the hypothesis of increasing neighborhood influence with increasing age of the child. Male joblessness was associated with both internalizing and externalizing problems among preschoolers and among black 5- and 6-year-olds.[9] Several other effects were found for the remaining neighborhood measures for the older children only, but none showed a clear pattern across both datasets. For both cognitive and behavioral outcomes, and for both younger and older children, family factors (i.e., family income, mother's education and race) accounted for most of the variance in the regression analyses, once again indicating that family-level factors are more critical than neighborhood factors. This study also suggested that neighborhood effects may not function in a linear manner. In particular, for black and female children ages 5 and 6, the presence of affluent neighbors is related to higher IQ scores *only* when there is a moderate concentration of affluent neighbors (i.e., falling between the 25th and 75th percentiles of the full sample).

In their most recent study, Brooks-Gunn and her colleagues again examined the children from the IHDP (Klebanov et al., 1998), this time to determine exactly when community economic factors begin to exert their influence on child outcomes. They hypothesized that associations between neighborhood characteristics and child outcomes would not appear within the first two years of life, since infants have limited exposure to their neighborhoods at this young age and what exposure they have is likely mediated by their parent(s). Cognitive functioning was chosen as the outcome measure. In this sample of 347 infants (black and non-Hispanic white children only), the researchers found that neighborhood effects indeed did not appear until age 3. Controlling for family poverty and other family risk factors, they found that children from more affluent neighborhoods had higher IQ scores than children from less affluent neighborhoods.

Taken together, these studies indicate that community-level affluence is more influential than is community-level poverty on child outcomes, even after taking family characteristics into account. However, community affluence is associated only with cognitive, not socioemotional, child outcomes and only after the age of three. Male joblessness in the surrounding community appears to influence young children's behavioral outcomes, although the data are mixed with regard to influences on internalizing vs. externalizing problems (e.g., depression vs. acting out). It is also clear from the studies reviewed above that neighborhood influences are often mediated by family-level factors, such as family structure and the home learning environment.

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[9] Internalizing problems are emotional disorders that have subtle or no external markers, such as emotional withdrawal or depression. In contrast, externalizing problems are emotional/behavioral disorders that manifest themselves externally, such as hitting, kicking, chronic crying or acting out.

There are several limitations to the studies mentioned above. First, none of the studies are based on datasets that are representative of the entire U.S. population of infants and preschoolers, and therefore generalization is limited. Future research should investigate neighborhood effects on a fully representative sample of preschoolers (Chase-Lansdale et al., 1997). Second, because of potential selection bias on the part of families within communities, it is impossible to confirm that the neighborhood measures are indexing purely neighborhood factors, and not family factors. In effect, the measurements of neighborhoods could simply reflect the characteristics of the families who live there. To date, there is only one study that is capable of truly disentangling selection bias from the effects of neighborhood characteristics. That study is called Moving to Opportunity (MTO).

Moving to Opportunity (MTO) is a demonstration project established by the Department of Housing and Urban Development (HUD) in March of 1994. The study is experimental and longitudinal in its design and has as its goal "reducing concentrations of poverty and moving public housing families to self-sufficiency in better neighborhoods" (Goering et al., 1999, foreword). The MTO program was inspired by previous voucher-based mobility programs—most notably the Gautreaux program in Chicago. The Gautreaux program was established in the 1970s as a court-ordered remedy. Families were relocated from the south and west sides of Chicago to other areas of the city and the Chicago suburbs. Results of evaluation studies indicated that moving families to suburban communities increased adults' employment opportunities and children's educational opportunities and outcomes (Rosenbaum, 1995). However, the design and focus of MTO represent improvements over previous mobility programs, such as the ones in Chicago, Cincinnati and Hartford (Donavan, 1993, as cited in Goering et al., 1999; Fischer, 1991; Rosenbaum, 1995). All previous programs focused primarily on the racial composition of neighborhoods, whereas MTO focuses on the poverty rates of neighborhoods. Furthermore, all of the previous programs did not or could not adequately control for self-selection biases (Goering et al., 1999).

Families eligible to participate in MTO had to be residing in neighborhoods in which at least 40 percent of the population was poor and had to have at least one child under age 18 living in the home; families also had to be income-eligible for Section 8 housing. As of March 1999, roughly 5,000 families were enrolled in the program across five different cities (Baltimore, Boston, Chicago, Los Angeles, and New York). Once families volunteered to participate, they were randomly assigned to one of three "treatment groups": (1) the *MTO treatment group* received a Section 8 certificate or voucher useable only in low-poverty areas (i.e., less than 10 percent of the population was below the poverty line in 1989) along with counseling and assistance in finding a private rental unit; (2) the *Section 8 comparison group* received a voucher for relocating, but no restrictions on where to relocate and no special counseling beyond what would normally be received from the housing authority; and (3) the *in-place control group* received no certificates or vouchers but continued to receive project-based assistance.

The research plan is to follow these families over the course of 10 years to see the effect that moving to a low-poverty neighborhood has on child and family outcomes. Of particular interest are changes in employment, income, and educational achievement.

The preliminary findings currently available show that the MTO treatment group did make different choices of where to live than the Section 8 comparison group. The treatment group families were more likely to choose to be located away from the center of the city in low-poverty neighborhoods, whereas the Section 8 comparison group households chose apartments near the center of the city and often in close proximity to their original project homes. In a 1997 canvass of the study participants, 72 percent of the MTO treatment group were still living in low-poverty neighborhoods, whereas only 25 percent of the Section 8 comparison families were living in low-poverty census tracts (Goering et al., 1999). These findings suggest that the extra support provided by non-profit counseling organizations in the five cities played an important role in enabling low-income families to make a successful transition into new neighborhoods. The effect of the counseling was significant, even after taking into account family characteristics (Goering et al., 1999, p. 26).

To date, there are few findings from MTO that directly address school readiness and children's academic success, although in future years more data will become available. One recent study of the Baltimore site of MTO has assessed the relationship between the accessibility of affordable rental housing in the Baltimore area and changes in the educational opportunities of MTO children, as measured by school characteristics (i.e., school-level data from the Maryland Department of Education on student pass rates on statewide standardized reading and math tests, socioeconomic and racial composition of the student body and student mobility) (Ladd & Ludwig, 1997). The researchers focused on average student outcomes as well as each school's "value-added" contribution to students' learning experiences. To calculate a school's value-added, they adjusted the school-based measures for effects of student characteristics and prior performance (both assessed using proxy measures, since longitudinal measures were lacking). Their analyses indicated that public-housing residents who are given unrestricted Section 8 vouchers in Baltimore are likely to move to other parts of the city with poverty rates at 10 percent or above (that is, *not* affluent neighborhoods). Schools in these areas of the city are not much better than the schools serving the public housing projects. However, families given Section 8 vouchers that are restricted to low-poverty areas (the MTO treatment group) tend to move to the suburbs or to low-poverty areas of the city, and by doing so, improve their children's educational opportunities. This conclusion holds true for analyses of both average student outcomes and value-added school measures.

Community Organizational Factors

The idea that "it takes a relatively wealthy village to raise a child" has some support from the literature on community resources and collective socialization. All children (but especially those from low-income, low-education and single-parent backgrounds) may benefit from experiences that their families cannot provide. The communities in which children live may hold additional physical, institutional and social resources that can contribute to a child's readiness for school. For example, playgrounds, recreation facilities and libraries can provide opportunities for play and access to stimulating learning materials that may then contribute to children's developing motor and cognitive skills. In addition, fire and police stations, grocery stores and retail stores help to ensure the health and safety of children within neighborhoods. Beyond these institutional resources, there are human resources available as well. Neighbors can serve as additional

role models, mentors, disciplinarians and supervisors for the children in the neighborhood. This form of collective socialization is particularly helpful to single parents and their children (Brooks-Gunn & Duncan et al., 1993). Furthermore, adult neighbors can create social networks (i.e., increase their social capital) to connect to important resources and opportunities.

Anecdotal evidence from focus groups with MTO participants suggests that neighborhood effects are best explained by *neighborhood resources* and *collective socialization* rather than by theories of contagion, competition or relative deprivation. For example, MTO treatment parents report feeling safer and more comfortable about letting their children play outside without constant supervision. MTO treatment parents also reported seeing more role models of working adults in their new neighborhoods, and this they perceived as inspirational to both themselves and their children. Parents also reported that the schools were of better quality and less crowded in their new neighborhoods, and that teachers were spending more individual time with their children. Anecdotal evidence is no substitute, however, for more empirically-based evidence.

In their 1995 survey of 8,782 residents within 343 Chicago communities, Sampson, Raudenbush, and Earls (1997) found that *collective efficacy* (a term they use to describe the level of social cohesion within a community) was negatively related to the amount of neighborhood violence within communities, even after accounting for individual-level characteristics, measurement error and prior violence.

Coulton and her colleagues examined the effect of community characteristics on rates of infant mortality, low birth weight and child abuse in Cleveland communities (Coulton et al., 1995; Coulton & Pandey, 1992). To carry out these analyses, they used a database developed for the city of Cleveland that combined information on the social, economic, demographic and physical characteristics of more than 180 census tracts in Cleveland with administrative data on the incidence of selected social problems, health conditions and educational outcomes in each of those tracts. Interestingly, they found that the areas that posed the most risk for young children, in terms of infant mortality and LBW, were not necessarily the highest poverty areas, which suggested that neighborhood poverty *per se* was not as important as other aspects of the social and physical environment (Coulton & Pandey, 1992). Similarly, it was not community poverty alone that explained most of the variance in child abuse in Cleveland communities, but rather it was the combination of community impoverishment, community child-care burden and residential instability (Coulton et al., 1995). The Cleveland communities that posed the most risk to young children shared the following characteristics in addition to high rates of poverty: a high rate of single-parent families, births to unmarried mothers, female-headed households, high crime rates, concentrated public housing, abandoned housing, racial segregation and high rates of male unemployment.

There are several limitations to these studies. First, each was conducted in a particular city, and therefore it is not clear how widely their results apply. Second, these studies (except for MTO) are all cross-sectional in design and therefore no causal relationships can be determined. Nevertheless, they point suggestively to the conclusion that community organizational factors play a role in children's positive development, though a role that is generally superceded in importance by the family's influence.

Methodological Issues Pertaining to Community and Neighborhood Factors

The definition of neighborhood or community contains both social and geographic components. Depending on the phenomenon of interest, a neighborhood can be defined as the block upon which an individual resides, a group of blocks around the residence, or an entire city region. The operational definition of a neighborhood used by most researchers of large-scale studies is the census tract (or alternatively, block groups within census tracts, or zip codes). Although there are advantages to using this operational definition (e.g., census tracts are universally recognized and standardized demarcations of residential boundaries, and researchers have access to administrative data on household and neighborhood characteristics by census tract), one trade-off is that you lose the level of detail associated with individuals' perceptions of their own social and geographic boundaries within these areas. Furthermore, it is not clear that census tracts are an adequate proxy for community-level *processes* (Aber, Gephart, Brooks-Gunn, & Connell, 1997). It is also not clear if there is selection bias operating in people's choices of neighborhood. Ethnographic or observational research methods, combined with census tract data, may yield a more precise image of neighborhoods. Unfortunately, adding these additional layers of data collection is an expensive and time-consuming proposition. Nevertheless, a more fine-grained picture of the neighborhood (at the level of social organization, institutional functioning, and community process) would help illuminate the connections between neighborhood influences and child outcomes (Gephart, 1997).

Summary

Residing in a relatively affluent neighborhood (i.e., a neighborhood with less than 10 percent poverty) appears to have a direct effect on children's cognitive abilities, above and beyond the influence of family characteristics (Brooks-Gunn & Duncan et al., 1993). The impact of affluent neighbors does not appear until age three, however, and appears to become increasingly important as children transition into schooling. Both theory and anecdotal evidence suggest that more affluent neighbors model important behaviors such as regular school attendance and employment. Affluent neighbors also offer important human capital that can benefit less-affluent families in their midst. There is some evidence that suggests moderate levels of affluence in a neighborhood is enough to boost cognitive outcomes for some children. Young children's behavioral and physical outcomes (in the form of internalizing and externalizing problems, infant mortality, low birth weight and child abuse) appear to be influenced by the level of male unemployment in neighborhoods, above and beyond family characteristics (Chase-Lansdale et al., 1997; Coulton et al., 1995). In addition, the degree to which people within a community feel responsible for one another and trust in one another has been found to make a difference in the level of crime and juvenile delinquency within neighborhoods (Sampson et al., 1997). Collectively, these findings suggest that interventions focused on aiding low-income families to relocate to more affluent neighborhoods would be beneficial for improving young children's chances of school success. The alternative strategy of investing in new businesses and industry in areas where currently there is high unemployment, or providing job-training and/or job-placement assistance for unemployed individuals, should also be evaluated for its implications for children. In addition, improving the quality and quantity of community resources and infrastructure should also be assessed for its ability to boost child and family functioning.

While a lot of attention has been focused on the negative effects of poor neighborhoods on child outcomes during early childhood, it turns out that much of the impact of poor neighborhoods may be mediated through the home environment (Brooks-Gunn & Duncan et al., 1993; Klebanov, Brooks-Gunn, and Duncan, 1994). That is, parents who provide warm, supportive home environments for their children, who use appropriate parenting behaviors and who provide stimulating and age-appropriate learning experiences for their children may be able to off-set the potentially negative influences of living in an impoverished neighborhood. But parents who are residing in low-income neighborhoods may not have the emotional, material, or institutional resources to provide this kind of environment for their children. Therefore, programs that help support parents in their efforts to parent effectively may be especially helpful to families living in low-income neighborhoods. These suggestions stem from a theoretical perspective that stresses the importance of community resources and collective socialization. Unfortunately, no experimental or longitudinal studies to date have adequately investigated the level of social organization, institutional functioning or community process that is necessary for optimal outcomes among families within impoverished neighborhoods.

Beyond the Community: Media Effects

Children today are growing up with media as a large part of their everyday lives. In a recent, nationally representative survey of 1,090 2- to 7-year-olds, Roberts and his colleagues (Roberts, Foehr, Rideout, & Brodie, 1999) found that young children are exposed to some form of media for an average of 4 hours and 17 minutes per day. This breaks down to two hours per day watching television; 45 minutes per day reading magazines, newspapers, or books; 45 minutes per day listening to the radio, tapes, or CDs; 31 minutes per day watching taped television shows, commercial videotapes, or movies; eight minutes per day playing video games; and seven minutes per day using a computer (primarily for games). While 2- to 4-year-olds are exposed to media for slightly more time per day than 2- to 7-year-olds (4 hours, 24 minutes), the breakdown of how much time is spent with which media is essentially the same. Of children ages two to seven, 35 percent live in households where the television is on most of the time and 47 percent where the television is on during meals. Twenty-six percent of children ages two to four have a television in their bedroom, and 14 percent have a VCR in their bedroom. However, 71 percent of 2- to 7-year-olds live in homes where there are household television rules (Roberts, Foehr, Rideout, & Brodie, 1999). In this review, we examine the effects of media on the cognitive and social development of children ages 0 to 5.

Before we begin our review, several caveats are worth mentioning. The research on media and children does not include many studies that look at children ages 0 to 5, even though this is an age group that uses and is exposed to a significant amount of media every day. What research there is tends to focus on older children (age seven and above). Studies that examine the newer media of video games and computers typically focus on teenagers. There are also methodological limitations to this research. Studies of young children's use of media rely on parent reports and logs of what their children are watching. Parent logs are more reliable than parent reports; but neither is always an

accurate reporting mechanism, since parents may not be aware of all that the child is watching or may not complete the logs fully. However, children in this age group are too young to report their own media use. Another limitation in this area of research is that most studies include only or primarily white, middle-class children.

Effects of Television on Children's School Readiness

Most studies on the effects of media on child development have studied television. This is due in part to the relative newness of other types of media (i.e., video games, computer games, the Internet), and in part because television is the form of media to which children have the most access and exposure. Overall, television studies have found that (1) content is more important than the medium itself; (2) children are active, not passive, viewers; (3) the amount of television that children watch increases rapidly over the first few years of life; and (4) individual differences in children's viewing preferences develop early and remain relatively stable over time (Huston & Wright, 1998).

Many people have been worried that the time children spend watching television displaces time they would otherwise spend in more academic endeavors. While some studies have found that time spent watching television can take away from time spent engaging in physical and social activities, television does not necessarily interfere with time that children spend reading or being read to (Huston & Wright, 1998). Television is typically considered to be an entertainment activity; therefore, it is most likely that watching television takes the place of other entertainment activities instead of educational ones. The content of the shows that young children watch has been associated with the amount of time they spend reading or being read to. Frequent[10] viewers of educational television spend more time reading or being read to than children who are frequent viewers of cartoons and entertainment programs geared towards adults (Huston & Wright, 1998).

What kinds of shows children watch has also been associated, both positively and negatively, with school readiness. An extensive evaluation of *Sesame Street* conducted in the 1970s found that children who were frequent viewers of *Sesame Street* were, according to their first grade teachers, better prepared for school and had a more positive attitude towards school (Bogatz & Ball, 1971). Other studies have found that children who are frequent viewers of cartoons and adult programming perform more poorly on measures of prereading skills and school readiness (Huston & Wright, 1996; Wright & Huston, 1995).

Television Effects on Language and Cognitive Development

Both experimental and naturalistic studies have found that it is possible for preschoolers to learn vocabulary from television, especially educational television. Rice and Woodsmall (1988) found that both 3-year-olds and 5-year-olds, in a laboratory setting, learned object, action, and attribute words (but not words about feelings) from a

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[10] Many of these studies compare children based on the amount of television they watch. The children are typically described as "heavy" or "frequent" viewers versus "light" or "infrequent" viewers. However, in the studies we examined, no numerical definition was given for these terms.

television cartoon with narrative designed specifically for this study. The 5-year-olds learned more object and attribute words than the 3-year-olds. There are some qualifications on these findings that the researchers themselves point out. First of all, the vocabulary test was given right after the children saw the show. Therefore, while the children were able to identify the words immediately after the show, it does not indicate whether the words became a part of their long-term memory and vocabulary. In addition, the children were viewing under circumstances that encouraged them to pay close attention to the show. In the real world, children's time in front of the television is often spent also engaged in other activities. Therefore, as the researchers themselves point out, this study is an example of what "television viewing *can* do versus what it *does* accomplish" (Rice & Woodsmall, 1988, p. 426).

Naturalistic, longitudinal studies of educational television have demonstrated gains in cognitive and language development for younger but not older preschoolers. The Early Window study followed a group of 2-year-olds and a group of 4-year-olds from low- and moderate-income families for three years. For the 2-year-old group, watching educational programs like *Sesame Street* contributed to the children's school readiness, letter and number skills, and vocabulary, regardless of parent education, income, native language, or quality of the home environment. No effect was found for the children who were followed from age 4 to age 7 (Wright & Huston, 1995). One possible reason for this difference between age groups is that *Sesame Street* is targeted to children ages 2 to 5. Being at the beginning of this age range, the 2-year-olds likely gain more from watching than the 4-year-olds who presumably have already learned much of what the show is teaching. Another possible reason is that children are developing more rapidly in these areas from age two to five than they are from age four to seven.

Another longitudinal study of educational television found similar results for younger versus older preschoolers. A longitudinal, naturalistic study that followed a group of 3-year-olds and a group of 5-year-olds for two years found that watching *Sesame Street* was positively related to the children's scores on a measure of vocabulary. This was true for children regardless of their gender, parent education levels, family size, and parental attitudes towards television (Rice, Huston, Truglio, & Wright, 1990). Viewing *Sesame Street* was a significant predictor of vocabulary scores at age 5 for the younger group, but not at age 7 for the older group. The authors suggest that this is because *Sesame Street* is geared towards 2- to 5-year-olds, and because there is rapid growth in verbal language during this age range. Five- to seven-year-olds are still acquiring language skills and vocabulary, but perhaps at a level above that presented on *Sesame Street*. Watching other types of child and adult non-educational programming did not predict vocabulary scores for either group. There were four other noteworthy findings in this study. First, parent education was positively related to vocabulary scores at all age levels. More highly educated parents probably expose their children to more educational activities. Second, parents' positive attitudes towards television generally were negatively related to vocabulary scores. It is possible that parents who have positive attitudes towards television spend less time engaging their children in other activities. Third, parents' encouragement of watching *Sesame Street* was negatively related to vocabulary scores. Parents may be more likely to encourage children who are developing slowly to watch *Sesame Street*, thinking that it will help their language development (Rice, Huston, Truglio, & Wright, 1990). However, children who are developing slowly may be more

likely to have lower vocabulary scores regardless of what their parents encourage them to watch.

For older children, watching a large amount of general entertainment television can inhibit the development of reading skills (Beentjes & van der Voort, 1988). However, television viewing is not as important in explaining differences in reading and school achievement as are individual differences in family background, the child's academic ability, how much exposure the child has to print media, and, for school-age children, the amount of time spent doing homework (Huston & Wright, 1998).

In a review of studies that examined the influence of television on daydreaming and creative imagination (Valkenburg & van der Voort, 1994), there was only one study that included children younger than age seven. This study, conducted by Singer, Singer, and Rapaczynski (1984a), followed 63 children for five years starting when they were 3- to 4-years-old. Regardless of differences in family background (i.e., parenting style, family lifestyle), the more television they watched as young children, the less creatively imaginative they were as older children. After age three or four, though, only the amount of time spent watching action and adventure programs was negatively related to their creative imagination scores at age eight or nine.

The type of show watched also appears to have an influence on the amount of fantasy play engaged in by preschoolers (van der Voort & Valkenburg, 1994). Correlational studies suggest that watching violent and action shows decreases preschoolers' fantasy play (Huston-Stein, Fox, Greer, Watkins, & Whitaker, 1981; Noble, 1970); nonviolent shows and programs such as *Sesame Street* have no effect on fantasy play (Anderson, Levin, & Lorch, 1977; Huston-Stein, Fox, Greer, Watkins, & Whitaker, 1981; Noble, 1970); and shows that are geared toward children and designed to encourage fantasy play can be successful at doing so (Singer & Singer, 1976).

Television Effects on Social Development

In addition to influencing academic and creative skills, television can affect children's social development. For decades, researchers and policy makers have been concerned with the effects of television violence on children's behavior. More recently, this concern has also included violence within video and computer games. The majority of research on the topic concludes that watching violence on television contributes to children's aggressiveness, as well as later violence and criminality (Hughes & Hasbrouck, 1996).

Early studies conducted in laboratory settings found that children will model aggression they have witnessed on television, especially if that aggression is not punished or is rewarded (Bandura, Ross, & Ross, 1963). Experimental studies of children in their everyday environments have consistently found that viewing television violence has small-to-medium effects on children's aggression (Hughes & Hasbrouck, 1996). Friedrich and Stein (1973) found that watching violent shows had a greater effect on children who were initially more aggressive. Another study found that watching more violent television shows as a preschooler predicted later aggression when it was combined with a high level of total preschool television viewing in a family that

emphasizes physical discipline and power-assertive control strategies (Singer, Singer, & Rapaczynski, 1984b).

Studies of television shows that encourage prosocial behavior, such as *Mr. Rogers' Neighborhood*, generally conclude that these shows are associated with an increase in prosocial behavior (Hearold, 1986). In one experimental study, children in Head Start classrooms either watched neutral television shows and participated in unrelated activities, watched *Mr. Rogers' Neighborhood* and participated in unrelated activities, or watched *Mr. Rogers' Neighborhood* and participated in activities designed to reinforce the show's prosocial messages. The group that watch *Mr. Rogers' Neighborhood* and participated in related activities exhibited increased prosocial behavior compared to the other two groups (Friedrich-Cofer, Huston-Stein, McBride Kipnis, Susman, & Clewett, 1979). An intervention that combines prosocial programming with activities designed specifically to reinforce the prosocial messages taught in that programming could be an effective means of teaching prosocial behavior.

Effects of Newer Media: Video Games and Computers

A recent national survey of media usage found that seven percent of 2- to 4-year-olds have a video game player in their bedroom, and four percent have a computer in their bedroom (Roberts, Foehr, Rideout, & Brodie, 1999). While young children are obviously exposed to and using newer forms of media, research on these media is not as extensive as research on television (Wartella, O'Keefe, & Scantlin, 2000). Despite limitations in the current breadth and depth of the research on newer media, one review of the literature on video games' effects on children of all ages found that video games are not directly related to psychopathology or academic performance (Emes, 1997). The author concluded that while video games can have negative effects (such as a potential increase in aggressive behavior), they can also be useful learning tools. Emes (1997) and Wartella and colleagues (2000) both note the need for more research, especially long-term studies, on this topic.

The literature on computers and preschoolers is also limited. Because children under age three learn best by using their whole bodies to experience the world, researchers generally recommend that children younger than three not use computers (Haugland, 2000). Some research shows that computer programs, when combined with activities that facilitate what the programs are trying to teach, can help 3- and 4-year-olds develop a range of skills, such as long-term memory, manual dexterity and verbal skills (Haugland, 1992). However, more extensive research is needed to determine definitively the effect of computers on young children (Wartella, O'Keefe, & Scantlin, 2000).

Interventions

Many of the potential interventions suggested in the literature are on a national scale or are directed at the media industry. Such interventions include creating a satisfactory rating system for television programming (Heath, Bresolin, & Rinaldi, 1989), or increasing the amount of educational television (Kunkel, 1998). Hughes and Hasbrouck (1996) note how difficult it is to regulate the amount of violence on television. They suggest focusing efforts instead on trying to increase the amount of prosocial programming, which could be facilitated by more governmental funding directed to this

purpose. Public awareness of the influence of television on children's social and cognitive development could help in promoting prosocial programming, but the effectiveness of current public education efforts by organizations (i.e., Action for Children's Television, Center for Media Education) has not yet been studied (Hughes & Hasbrouck, 1996).

At the other end of the spectrum, the research suggests that there are things that parents can do to positively influence their children's interaction with and understanding of television. As discussed earlier, educational and prosocial television can benefit children's development. Parents who watch television with their children and reinforce the educational aspects of shows most likely improve the quality of the learning experience for their children (Huston & Wright, 1998). Unfortunately, children do not usually watch educational television with their parents (St. Peters, Fitch, Huston, Wright, & Eakins, 1991). When children watch television with their parents, they are more likely to watch general audience programs than child-targeted programs (Huston & Wright, 1998).

Parents (and other adults) can also help children interpret what they are seeing on television and thereby reduce the likelihood of aggressive behavior after viewing violent programming. For example, in an experimental, longitudinal study, researchers taught first and third graders that television characters do not behave like most real people, the actors are only pretending to perform the aggressive acts we see, and most real people use nonaggressive means of solving problems. The children also had to explain in their own words why television is not real. The children who participated in this learning experience showed a reduction in aggression (as rated by their peers) even though the amount of television they watched did not change (Huesmann, Eron, Klein, Brice, & Fischer, 1983). While encouraging, it is important to note that this type of intervention is not necessarily applicable to preschoolers, since they are developmentally less able to understand that television is not real. Children come to understand that what is *on* the television does not exist *in* the television between the ages of two and four, depending on cognitive ability and real-world experience. Even by five years of age, though, children do not completely understand that the actors on television exist off television as people separate from their fictional characters (Huston & Wright, 1998).

Parents are in a better position than anyone to influence their children's viewing habits (Truglio, Murphy, Oppenheimer, Huston, & Wright, 1996), especially during the preschool years. This is when parents have the most control over their children's viewing and when viewing habits are established (Hughes & Hasbrouck, 1996). Research shows that children watch less television if their parents restrict their viewing, and if their parents are warm and communicative. Children watch more educational programming if their parents encourage them to do so; however, these same children also typically watch more television in general (Huston & Wright, 1998). Hughes and Hasbrouck (1996) suggest that educating parents of young children about the positive and negative effects of television on children's behavior could be an effective violence prevention approach.

Summary

In sum, media can benefit or hinder child development. Educational television shows, and perhaps educational computer games, that are appropriately geared towards the target

age group, can improve children's readiness for school both academically and socially. However, media can also have a negative influence on child development by displacing time spent in other, creative or recreational activities, or by encouraging aggressive behavior. Adults can mediate the effects of television on children's prosocial, creative and aggressive behaviors by monitoring children's television viewing, and by discussing and interpreting the behavior of characters on the shows children do view. Currently more information is needed about how the medium and the content of newer technologies affect child development and about how best to ensure that children benefit from these new technologies.

Part III: Recommendations for Community Action

In the table below, we summarize in very concrete terms the most effective "investments" for school readiness, based on the literature review presented in Part II. In the left-hand column, we have noted the level at which one may want to intervene, starting at the level of the child (e.g., child health) and working outward from an ecological perspective to the community-level factors and beyond. Activities or components of interventions that the literature indicates have significant impacts on school readiness are summarized in the column labeled "What Works." The "Mixed Reviews" column contains elements that have been shown to be effective in some but not all studies or have been found to be effective for some groups of children but not for all. Finally, the "Best Bets" column is for investments that would seem to be important from a theoretical standpoint, but currently there is no evidence of their effectiveness based on highly rigorous studies (e.g., experimental control group studies or longitudinal, multivariate studies).

Summary Table: Review of the Research Literature and Implications for Targeted Activities to Improve School Readiness

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
CHILD HEALTH				
Health in the Early Years	- At-home parenting videos for 1, 3, 5, 7, 10, & 12 months [leads to fewer severe illnesses] - Home visits, pediatric monitoring, attendance of infant in child development center, group meetings for parents (IHDP) [but different cognitive outcomes for different birth weight groups] - Prenatal care (doctor's visits, nurse home visits, proper nutrition) [guards against LBW births]			- Reduce unintended pregnancy (target female teens and males of all ages)
Immunizations	- Monetary incentives - Client-specific prompts - Increase access to public health institutions			- Create an effective immunization tracking system (IOM recommendation, 2000)
Nutrition	- Provide food vouchers (WIC, Food Stamp Program)			
Unintentional Injury	- For vehicle restraints: clinic-based parent education plus subsidies and/or positive reinforcement; Community-based, multiple pathway approach (effective for low-income families only) - For hot tap water safety: clinic-based parent education alone works - For smoke alarm ownership: clinic-based parent education alone works - For bicycle helmet use: Community-	- For child proofing a home: no good interventions found	- For general, unintentional injury: Community-based, multiple pathways (e.g., parent & community education, TV programs, school-based education, etc.)	

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
	level interventions that use multiple pathways (e.g., legislation, community-wide education campaign, etc.)			
Lead Exposure	- Removing lead paint from homes - Replacing lead water pipes			- Home maintenance - Parent education about good hygiene (e.g., washing hands after playing outside and before eating)
Dental Health				- Regular oral health screening - Parent education in oral health practices and proper feeding - Increase access to dental care providers - Coordinate dental health services with other services (e.g., WIC, child care, home visits, immunizations)
Child Emotional and Behavioral Problems				- "Two generation programs" - treat maternal and child depression - Alleviate family stress - Focus on the parent-child relationship
FAMILY FACTORS				
Family Economic Risk	- Job training and education for parents [improves children's cognitive outcomes] - Providing child care subsidies alone [leads to more use of formal child care		- Raising family incomes above the poverty level [confounded with providing child care subsidies] - Job training and education for parents [mixed results for child behavioral and emotional outcomes, but impacts for cognitive outcomes]	

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
	arrangements]		impacts for cognitive outcomes]	
Family Structure	- Two involved parents, regardless of marital status [improves children's cognitive and social outcomes] - Low conflict two-parent families [improves children's socioemotional outcomes] - Nurse Home Visitation (not paraprofessionals) beginning in pregnancy and continuing through child's second birthday [leads to wider birth spacing and fewer births over time, see additional outcomes below]		- Encouraging involvement between children and nonresident parents [need to take account of the quality of the interactions]	- Reducing unintended pregnancy - Reducing teen pregnancy - Financial contributions from nonresident parent [associated with children's cognitive and social outcomes]
The Home Environment	- Nurse Home Visitation: home visits by a nurse (not paraprofessional) beginning in pregnancy and continuing through child's second birthday to discuss parental health habits, parenting behaviors, and home safety [leads to reduction in child abuse, increase in child health, better academic and social outcomes for both parent and child] - Good parenting practices (e.g., sensitive response to child, non-coercive discipline) [leads to better socioemotional child outcomes]		- Other home visitation models using either professionals or paraprofessionals (Parents as Teachers; Family, Infant, Preschool Program; Healthy Families America; Home Instruction Program for Preschool Youngsters) [improved parent-child interactions, reduced maternal depression, increased child cognitive abilities, but typically small and inconsistent gains in child outcomes, or gains for only some subgroups of families]	- Focusing on the parent-child relationship
EARLY CHILDHOOD CARE AND EDUCATION	- Emphasis on multiple areas of child development (cognitive, language, social & emotional) - Stimulating environments - Quality care for children in poverty - Small student/teacher ratios - Parent involvement - Collaboration with community services - Close, caring student/teacher	- Providing basic care in which simple routine needs are met but children aren't stimulated to learn	- Beginning care in infancy [depends on quality of the care]	

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
	relationships - Stable child care arrangements			
SCHOOL TRANSITIONAL PRACTICES	- Preschool attendance (especially for children in poverty)	- Redshirting (holding children out of kindergarten for a year)		- Contact between kindergartens and preschools - Contact between kindergartens and homes - Connections between schools and community resources - In-depth, careful screenings - Schools ready for all children
EMERGENT LITERACY				
Literacy Practices in Family Settings	- Parents reading to their children - "Dialogic" reading (making children an active part of shared book-reading by asking questions)		- Home visitation programs (i.e., HIPPY) [depends on level of involvement of parents, and intensity and quality of the program for literacy activities] - Family literacy programs (i.e., Even Start) [increases in adult GED attainment and number of books in the home, but no impacts on children's literacy; effects are dependent on intensity of program and level of participation by families]	- Providing low-income families with books (i.e., Reach Out and Read)
Literacy Practices in Early Childhood Care and Education Settings	- Teaching children the alphabet and letter-sound associations - One-on-one or small group interactions around book reading - Phonological training (i.e., separating individual sounds in words, rhyming) *combined with* "dialogic" reading (making children an active part of shared			

AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
	book-reading by asking questions, etc.)			
COMMUNITY/ NEIGHBORHOOD FACTORS				
Community Economic Factors	- Having affluent neighbors [predicts higher IQ]		- Not living among poor neighbors [mostly mediated by family-level factors] - Reducing concentrated poverty	- Investing in community infrastructure - Increasing jobs for men in inner-cities, municipalities, and rural areas
Community Organizational Factors			- Increasing racial diversity within neighborhoods	
MEDIA EFFECTS				
Television	- Watching educational programs such as *Sesame Street* (with or without parental supervision) increases children's vocabulary, letter and number knowledge, and positive attitudes toward school (but effects are most robust for children ages 2 to 4) - Watching prosocial television shows such as *Mr. Rogers' Neighborhood*, in combination with adult-guided, supportive activities, increases children's prosocial behavior			- Legislation to increase the amount of educational and prosocial programming for children - Educate parents on the positive and negative influences of television - Encourage adults to explain the actions and motivations of television characters to young children (this can increase children's prosocial behavior and reduce children's aggressiveness when viewing prosocial and violent shows, respectively)

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AREAS FOR TARGETED INTERVENTION ACTIVITIES	WHAT WORKS	WHAT DOESN'T WORK	MIXED REVIEWS	"BEST BETS"
				- Parental monitoring of children's television viewing, and adult modeling of good television viewing habits
Video and Computer				

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